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SUPPLEMENT

TO THE

CATALOGUE

OF

SEALS AND WHALES

IN THE

BRITISH MUSEUM.

BY

JOHN EDWARD GRAY, F.R.S., F.L.S., &c.

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SUPPLEMENT

TO THE

CATALOGUE

OF

SEALS AND WHALES.

Suborder PINNIPEDIA.

Phocidæ, *Catalogue of Seals & Whales*, p. 1.
Pinnipedia, *Illiger, Prodr.* p. 138, 1811.
Pinnipedes, *Gill's Prodomus, Proceedings Essex Institute*, vol. v. 1866.

Family 1. PHOCIDÆ.

Muffle hairy on the edge, and between the nostrils. Ears without any conch, merely a small aperture. Arms and legs very short; wrist very short. Toes subequal, arched, exserted. Hind feet large, fan-shaped; the inner and outer toes large and long, the three middle ones shorter. The palms and soles hairy. Claws distinct, sharp. Skull:—postorbital process none or obsolete; no alisphenoid canal; the mastoid process swollen, seeming to form part of the auditory bulla. The scapula expanded upwards and backwards towards the posterior superior angle. Testicles enclosed in the body of the animal, without any external scrotum.

Phocidæ, *Gray, Ann. & Mag. N. H.* 1869, vol. iv. pp. 268, 342, 344; *Gill, Proc. Essex Instit.* 1866, p. 5; *Allen, Bull. Mus. Comp. Zool.* ii. 1870.

Sect. I. *Cutting-teeth* $\frac{6}{4}$, *curved, conical, and small. The palate produced nearly to the hinder molars.*

Tribe I. *PHOCINA.*

Skull tapering in front. Nose-hole moderate. Molars, except the first, with two roots.

Phocina, *Gray, Cat. Seals & Whales*, p. 20.

Inhab. North Atlantic and Arctic Seas.

1. CALLOCEPHALUS.

Callocephalus, *Gray, Cat. Seals & Whales*, p. 20.

2. PAGOMYS.

Pagomys, *Gray, Cat. Seals & Whales*, p. 22.

3. PAGOPHILUS.

Pagophilus, *Gray, Cat. Seals & Whales*, p. 25.

1. Pagophilus? equestris.

Brown, with a ring round the head, a ring round the fore limbs, and a broad band round the middle, white. The female whitish brown, with an obscure band across the hinder part of the back.

Phoca equestris, *Pallas, Zoog. Ross.-Asiat.* i. p. 340; *Schrenck, Amur-Land*, p. 182, tab. 9. figs. 1–3.

Phoca fasciata, *Shaw, Zool.* i. p. 276 (from the Ribbon-Seal, *Pennant's Quad.* 276).

Phoca annellata, *Radde, Reisen im Süden von Ost-Sibirien*, 1862, i. p. 296, t. 1–3.

Inhab. North Pacific.

2. Pagophilus? ochotensis.

Phoca ochotensis, *Pallas, Zoog. Ross.-Asiat.* i. p. 117; *Schrenck, Amur-Land*, p. 181.

Inhab. North Pacific.

4. HALICYON.

Halicyon, *Gray, Cat. Seals & Whales*, p. 27.

1. Halicyon Richardi.

Halicyon Richardi, *Cat. S. & Whales*, p. 30.

Inhab. North Pacific; Columbia River.

2. Halicyon Pealei.

Halichœrus antarcticus, *T. Peale, U. S. Expl. Exp.*

Mr. Gill says that this is a typical species of *Phoca*, but appears to be identical with those that occur along the Californian and Oregonian coast, so that there must be some error as to the assigned habitat in the Antarctic seas—and proposes the name *Phoca Pealii* (Proc. Essex Instit. vol. v. p. 4).

5. PHOCA.

Phoca, *Cat. Seals & Whales*, pp. 6 & 31.
Erignathus, *Gill*, 1865.

1. Phoca barbata.

Phoca barbata, *Gray, Cat. Seals & Whales*, p. 31.
Phoca lanica, *Rees, Cyclopædia*, PHOCA (from *Lepechin*).

Inhab. North Sea.

2. Phoca naurica.

Phoca barbata, *Temminck, Fauna Japonica.*
Phoca naurica *et* Phoca albigena, *Pallas, Zoog. Ross.-Asiat.* i. pp. 108, 109 (vide *Schrenck*); *Schrenck, Amur-Land*, p. 181.

Inhab. North Pacific; Japan. Mus. Leyden.

Tribe II. *HALICHŒRINA.*

Muzzle broad, rounded. Skull higher in front. Nose-hole very large. Grinders conical; the two hinder of the upper and the hinder one of the lower jaw double-rooted.

Inhab. North Atlantic and Arctic Seas.

6. HALICHŒRUS.

Halichœrus, *Gray, Cat. Seals & Whales*, pp. 6 & 33.

Sect. II. *Cutting-teeth four above, and four or two below.*

Tribe III. *MONACHINA.*

Cutting-teeth $\frac{4}{4}$; upper transversely notched. Palatine bones not produced beyond the inner margin of the orbits.

Inhab. Mediterranean and North Atlantic.

7. MONACHUS.

Monachus, *Gray, Cat. Seals & Whales*, pp. 6 & 17.

Tribe IV. *STENORHYNCHINA.*

Cutting-teeth $\frac{4}{4}$; conical, acute. Hinder feet nearly clawless.

Stenorhynchina, *Gray, Cat. Seals & Whales*, p. 8.

Inhab. Antarctic Ocean.

1. *Lower jaw strong, angulated behind. Grinders two-rooted, except the first in each jaw.*

8. STENORHYNCHUS.

Stenorhynchus, *Gray, Cat. Seals & Whales*, p. 15; *Gill, l. c.* p. 10.

1. Stenorhynchus leptonyx.

Stenorhynchus leptonyx, *Gray, Cat. Seals & Whales*, p. 16.
Stenorhynchus leptonyx (Sea-leopard), *Abbott, P. Z. S.* 1868, pp. 192 & 527.

Inhab. Falkland Islands (*Abbott, Lecomte*).

This Seal appears to extend from the Antarctic seas to New Zealand, the shores of New South Wales, and the Falkland Islands.

2. *Lower jaw moderate. The three front upper and first front lower grinders single-rooted; the rest two-rooted.*

9. LOBODON.

Lobodon, *Gray, Cat. Seals & Whales*, p. 8; *Gill, l. c.* p. 10.

3. *Lower jaw very weak. Front grinder in each jaw single-rooted; the rest two-rooted.*

10. LEPTONYX.

Leptonyx, *Gray, Cat. S. & W.* p. 11; *Gill, l. c.* p. 10.

11. OMMATOPHOCA.

Ommatophoca, *Gray, Cat. S. & W.* p. 13; *Gill, l. c.* p. 10.

Tribe V. *CYSTOPHORINA.*

Cutting-teeth $\frac{4}{4}$; grinders with large swollen roots and a small compressed simple plated crown. Muffle of male with a dilatable appendage.

Cystophorina, *Gray, Cat. S. & W.* p. 38.

12. MORUNGA.

Morunga, *Gray, Cat. S. & W.* p. 38.
Macrorhinus, *Gill, l. c.* p. 9.

1. Morunga elephantina.

Morunga elephantina, *Cat. S. & W.* p. 39.

One of the Falkland Islands is called Elephant Island, from the former abundance of Sea-elephants there; but Mr. Sclater informs us that when Lecomte visited it, it was "found to be quite deserted by this animal, which is said now to be entirely extinct * in the Falklands, though its former abundance in certain spots is well known, and is further testified by remains of its bones and teeth met with on the shores, specimens of which were obtained and sent home."—*P. Z. S.* 1868, p. 527.

This latter assertion is a mistake, for the bones sent home were those of *O. jubata*, as is proved by the following remarks of Dr. Murie :—"Lecomte and his companions believed these large old

* See Dr. Sclater's previous statement, P. Z. S. 1868, p. 189.

skulls of *Otaria jubata* [which he brought home] to be those of the Elephant-seal (*Morunga elephantina*), as it was stated by some of the party that these animals formerly did exist on this island. One of the pilots (Louis Despreaux by name) had resided thirty-two years on the Falkland Islands, and he distinctly remembered shooting many Elephant-seals in the neighbourhood in bygone years; but about twelve years ago they began to get scarce and disappear." And further on he observes that they are "now only rarely met with in the Falklands."—*P. Z. S.* 1869, pp. 106 & 109.

2. Morunga angustirostris.

Macrorhinus angustirostris, *Gill, l. c.* p. 13; *Cope, Proc. Acad. N. Sc. Philad.* 1865, p. 51.

Inhab. California from Cape San Lucas to Point Reyes.

Its colour is light brown when the hair is grown to the full length. The males are from 18 to 22 feet long. Females 10 feet long. Canines of the males 4 or 5 inches long.

13. CYSTOPHORA.

Cystophora, *Gray, Cat. S. & W.* p. 40; *Gill, l. c.*

North Atlantic.

Callocephalus vitulinus.
Callocephalus dimidiatus.
Pagomys fœtidus.
Pagophilus grœnlandicus.
Phoca barbata.
Halichœrus grypus.
Cystophora cristata.

Caspian Sea and Lake Baikal.

Callocephalus caspica.
*Pagomys fœtidus.

Tropical Atlantic.

Monachus tropicalis. *Jamaica.*
Cystophora antillarum. *West Indies.*

Mediterranean and Subtropical Atlantic.

Monachus albiventer.

North Pacific.

Halicyon Richardi.
Halicyon? Pealii.
Pagophilus? equestris.
Pagophilus? ochotensis.
Phoca naurica.
Morunga angustirostris.

Antarctic Ocean.

Lobodon carcinophaga.
Leptonyx Weddellii.
Ommatophoca Rossii.
Stenorhynchus leptonyx.
Morunga elephantina.

New Zealand.

Stenorhynchus leptonyx.

Australia.

Stenorhynchus leptonyx.

Family 2. TRICHECHIDÆ.

Trichechidæ, *Gray, Ann. Philosoph.* 1825, p. 348; *Ann. & Mag. N. H.* 1869, iv. p. 268.
Rosmaridæ, *Gill, Proc. Essex Inst.* v. 1866, p. 11.
Trichechina (part.), *Gray, Cat. S. & W.* p. 33.

Muzzle very broad, truncate, convex, swollen above. Ears without any conch. Eyes prominent. Canines very large, exserted.

Cutting-teeth $\frac{4}{2}$ in young, and $\frac{2}{2}$ in adult; grinders all single-rooted. The anterior feet as large as the posterior ones; the fingers decrease in a curved line, destitute of claws; the hind feet with five toes, very gradually increasing towards the inner, all provided with claws; palms and soles hairy in the young, becoming chaffy. Tail rudimentary. Skull with no postorbital processes. A distinct alisphenoid canal. Mastoid process strong and salient, with its surface continuous with the auditory bulla. The scapula, hinder margin nearly straight, with the spine a short distance from and somewhat parallel with it. Resting on its body with the fore feet extended and the hind feet doubled under it, moving by the exertion of the abdominal muscles. (See P. Z. S. 1853, p. 112.)

1. TRICHECHUS.

Trichechus, *Gray, Cat. S. & W.* p. 35.

1. Trichechus ——?

Trichechus rosmarus, *Schrenck, Amur-Land*, p. 179.

Inhab. North Pacific.

Family 3. OTARIADÆ.

Nose simple; muffle rather large, callous above and between the nostrils. Ears with a cylindrical, external conch. Arms and legs rather elongate. The fore and hind feet fringed. Fore feet finlike, with a scolloped naked membrane. Palms and soles bald, longitudinally grooved, more or less triangular. Fingers gradually diminish in size from the inner side. Hind feet elongate, narrow, all clawless. Toes nearly of equal length, the outer one on each side being rather the strongest (see Cat. Seals and Whales, p. 44, f. 15). Three middle toes clawed. The fur is generally provided with a more or less thick under-fur. Skull with a postorbital process. An alisphenoid canal. Mastoid process strong and salient, extending aloof from the auditory bulla. Cutting-teeth $\frac{6}{4}$, upper often bifid; canines conical; grinders $\frac{5}{5}$ or $\frac{6}{5}$. The scapula is curved backward to the upper angle, but with its spine or crest near the posterior margin. Testicles enclosed in the small external scrotum. They walk on their fore and hind limbs; they rest with the hind part of the body bent down, and the legs directed forward, like the Morse. The females lie on their backs to receive the caresses of the male; and the young are born on shore and are gradually taught to swim.

Otariadæ, *Brookes, Mus. Cat.* 1836, pp. 18, 28; *Gray, Ann. & Mag. N. H.* 1869, iv. p. 268; *Gill, Proc. Essex Inst.* 1866, v. p. 7; *Allen, Bull. Mus. Comp. Zool.* ii. p. 27.
Arctocephalina, *Gray, Cat. S. & W.* p. 44.

The Eared Seals (Otariadæ) form a distinct family from the Ear-

less Seals (Phocidæ). They have more power of using their limbs like the more typical mammalia, walking on them with the body raised from the ground; they rest with their hind limbs bent forwards. These habits are well shown in Dr. Forster's figures, engraved by Buffon; and they have been verified by the study of the living Eared Seal in the Zoological Gardens. Their scrotum and genital organs are exposed as in the Dog.

The *Otariæ* come to the surface during the process of mastication, and do not, like the Eared Seals, swallow under the water. They do not drink, while the common Seal occasionally sucks in water as a horse would. The pupils of the eyes dilate and contract to an enormous extent.

The Sea-bears (*Otariadæ*) inhabit the more temperate and colder parts of the southern hemisphere, and the temperate and more northern regions of the Pacific Ocean.

The *Otariæ* appear to make periodical migrations towards the south; and the Sea-lions (*O. jubata*) come to the Falkland Islands in November, where they remain till June or July, when the greater number depart; but some remain there the whole year round (P. Z. S. 1869, p. 108).

Navigators, from the general external resemblance of the animals, have regarded the Sea-lion and Sea-bear of the northern and southern regions as the same animal. Pennant (who paid considerable attention to Seals) and most modern zoologists have done the same.

Nilsson, in his excellent Monograph of the Seals, only mentions three species of Eared Seal:—1, *Otaria jubata*; 2, *O. ursina*; and, 3, *O. australis*. He believed that the first was common to the Falkland Islands, Chile, Brazil, New Holland, and Kamtschatka, and the second to Magellan's Straits, Patagonia, New Holland, and the Cape. We now know that the species have a very limited geographical distribution.

When I published my 'Catalogue of the Seals in the British Museum,' in 1850, I was satisfied from Steller's description that the species he described from the Arctic regions were distinct from those found in the Southern seas; and when I at last succeeded in obtaining specimens and skulls from the northern regions of the Pacific, I not only found that my idea was confirmed, but that they did not even belong to the same genera. I had the skulls of these species figured in the 'Proceedings of the Zoological Society' for 1859, and thus greatly extended the knowledge of the animals. But there is yet much to be learnt respecting them. We do not know the species of Fur-seal described by Forster as inhabiting the coast of New Zealand.

The skull of these animals changes so much in form as the animal arrives at adult and old age that it is not always easy to determine the species by it, unless you have a series of them, of different ages and states, to compare. Thus Dr. Peters, in his revision of the genus after the publication of my Catalogue and figures of the skulls in the 'Voyage of the Erebus and Terror' and in the 'Proceedings

of the Zoological Society,' formed no less than five species from the skulls of the southern Sea-lion (*Otaria jubata*)—*O. jubata*, *O. Byronia*, *O. leonina*, *O. Godeffroyi*, and *O. Ulloæ*,—referring the first four to the subgenus *Otaria*, and the last to *Phocarctos* (see Monatsbericht, May 1866, pp. 265, 270). In his second essay, published a few months later (*ibid.* Nov. 1866), after his visit to London, he placed them all together in one subgenus (*Otaria*), and seems, by the way in which he has numbered four of them, to doubt their distinctness. It would have been better if he had at once simply reduced them to synonyms (as they must be reduced) and included with them *O. Ulloæ*, which is only the skull of a young specimen, such as was called *O. molossina* by Lesson and Garnot. I may observe that I had shown in my first 'Catalogue of Seals' (1850), from the examination of the typical skull, that two or three of these nominal species were only very old or young skulls of the southern Sea-lion.

It is the character of the Eared Seals or *Otariadæ* to have a very close, soft under-fur between the roots of the longer and more rigid hairs. They are therefore called *Fur-Seals* by the sealers, and are hunted for their skin as well as for their oil. The quantity and fineness of the under-fur differ in the various species; and the skin and under-fur bear a price in the market according to the country and the species from which they are obtained.

Some species of the family have so little under-fur when they arrive at adult age, that they are of no value in the market to be made into "seal-skins;" these are therefore called *Hair-Seals* by the sealers. They are only collected for the oil, as the skins are of comparatively little value.

The skins of the Fur-Seal are much used in China, and are more or less the fashion in this country, sometimes being far more expensive than at others. The skins of the Hair-Seals are only used, like the skins of the Earless Seals or *Phocidæ*, for very inferior purposes, as covering boxes, knapsacks, &c.; but the animals are much sought after for the oil they afford.

The furs of the different species of Fur-Seals are exceedingly different in external appearance, especially in the younger specimens, or when the fur is in its most perfect condition. In most species the hairs are much longer than the under-fur; they are flat and more or less rigid and crisp. In others the hairs are short, much softer, scarcely longer than the soft woolly under-fur; in these species the fur is very dense, standing nearly erect from the skin, forming a very soft elastic coat, as in *O. falklandicus* and *O. Stelleri*.

The hair of *O. nigrescens* is considerably longer than that of *O. cinerea*, but not so harsh, the fur of the half-grown *O. nigrescens* being longer, sparse, flat, rather curled at the end, giving a crispness to the feel; while the hairs of the very young specimens are abundant, nearly of equal length, forming an even coat that is soft and smooth to the touch.

The length, abundance, and, indeed, the presence or absence of the under-fur greatly depend on the season at which the specimen

is obtained or observed. It is true that the sealers call some seals hair- and others fur-seals; but that is only because what they call hair-seals never had more than a very small quantity of under-fur in the fur-season; but, on the other hand, many fur-seals at some seasons have only a small quantity of the under-fur which is so long and abundant at other periods.

Difficult as it is for the zoologist to distinguish the species by their external appearance, the skins of the different species of Fur-Seals are easily distinguished by the dealers, even when they are wet, showing that the practical fellmonger is in advance of the scientific man in such particulars, as the dealers in whalebone were in regard to the distinction of the species of the Whale by their baleen (see Zool. Erebus & Terror).

The longer hairs of the Fur-Seals are very slender and pale-coloured at the basal half of their length, and thicker and darker at the upper half, and often have a white tip. The basal half is subcylindrical, the upper half is flat, tapering at each end. The absolute length of the under-fur differs in the various species. Judging from the old and young specimens of *A. nigrescens*, the hairs seem to be longer, both absolutely and relatively to the under-fur, in the young than in the adult animals. The hairs of the Hair-Seals are shorter, flat, channelled above, and gradually tapering from the base to the tip, merely contracted at the insertion into the skin. The breadth of the hairs seems to vary in the different species; and in the younger specimens there are to be observed some soft hairs like the under-fur of the Fur-Seals.

The *Fur-Seals* are *Callorhinus ursinus*, *Arctocephalus antarcticus*, *A. nigrescens*, *A. cinereus*, *A. Forsteri*, *A. falklandicus*, *Eumetopias Stelleri*, *Arctophoca Philippii*.

The *Hair-Seals* are *Otaria jubata*, *Phocarctos Hookeri*, *Arctocephalus nivosus*, *Zalophus Gilliespii*, *Neophoca lobatus*.

Dr. Peters, in his two papers on the Eared Seals (*Otaria*) uses the length of the ears and the existence or non-existence of the under-fur, as well as the characters used by Mr. Gill and myself, to separate the species of these animals into subgenera.

The length of the ears may probably afford good characters for the separation of the species and groups, if they can be observed in the living animals. As yet, only one species of these animals, the Sea-lion or Sea-bear (*Otaria leonina*), has been observed alive in Europe; so that Dr. Peters's notes could only be derived from the examination of more or less carefully preserved skins; and, I fear, little dependence can be placed on them.

The form of the hinder opening of the nostrils and the form of its front edge, when only one or two skulls of a species were examined, have been regarded as constituting a good character; but when an extensive series of the skulls of a single species, or of several species, have been examined, that part is found to vary considerably as to the width of its different parts, and especially in the form of its front edge. As far as my observations have extended, the hinder opening of the nostrils appears to become narrower, and especially its

front edge, as the animal becomes adult or aged; and in the skulls of the younger specimens it is broader, shorter, and the front edge is broader and more truncated or straight, with only a slight rounding at the sides.

The position of the grinders as regards the front part of the zygomatic arch is a good character for the distinction of the species, especially if a series of skulls from animals of different ages, and from the same locality, of each species are compared together; and it is the same with the rooting of the grinders themselves. But when adult skulls of different species are compared together, the forms of the skulls are so altered, the grinders generally so worn and altered by age, and their position in different species so similar, that the distinction of the species then becomes more difficult.

The flap of thick bald skin produced beyond the hinder toes varies in length as compared with the toes, in the length of it before it divides into lobes, and the length of the lobes themselves in different species, and thus affords characters for their separation; but it is difficult to determine the proper length of it and its parts from a preserved specimen in the Museum. It is apt to be unnaturally stretched in length and width by the preparer, and it shrinks as it dries long after it is placed in the Museum.

If I am not deceived by the prepared skins, the flap appears to be longer in the adult than in the young specimens; and judging from the specimens in the Museum, it is longest in *Callorhinus ursinus*, and it gradually becomes shorter in *Arctocephalus antarcticus*, *A. falklandicus*, *Phocarctos Hookeri*, *A. cinereus*, *Otaria jubata*, and *A. nigrescens*. It is very short in *Neophoca lobata* and *Eumetopias Stelleri*.

The "Prodrome of a Monograph of the Pinnipedes," by Mr. Theodore Gill, wherein he named several genera of this group, and a paper by Dr. Peters on the *Otariæ* of the Berlin Museum, in the 'Monatsbericht' for May 1866, have induced me to reexamine the skulls and skeletons in the British Museum.

I may observe that Dr. Peters considers all the Eared Seals one genus, but has divided them into seven subgenera, to each of which he gives a distinctive name. Dr. Peters's paper is interesting as determining the specimens described by Pander and D'Alton, Johann Müller, and other German naturalists, as well as describing the more recently received specimens in the Berlin Museum, which certainly is one of the most important on the Continent.

Captain Thomas Musgrave, in a work entitled 'Cast away on the Aucklands,' 12mo, 1866, pp. 141 and following, gives a very interesting account of the habits and manners of the Lion-seal, showing how unlike they are in their habits to the Seals without ears (Phocidæ). The female brings forth her young far inland, and has to teach them to take to the water which is to be their future home.

Captain Weddell gives nearly the same account of the habits of the Fur-Seal, as does also Mr. Hamilton (in Ann. & Mag. Nat. Hist. 1839, p. 87).

Mr. J. A. Allen, in the 'Bulletin of the Museum of Comparative

Zoology' at Harvard College, Cambridge, Mass., has published (1870) an essay on the Eared Seals (Otariadæ), with detailed descriptions of the North-Pacific species.

He divides the family into subfamilies:—

Subfam. 1. *Trichophocinæ*, without under-fur, and containing the genera Otaria, Eumetopias, Zalophus.

Subfam. 2. *Eulophocinæ*, with thick under-fur, containing Callorhinus and Arctocephlus.

He gives figures of the skulls of different ages of the North-Pacific species.

Mr. Allen had only the skins in salt and the bones of two North-Pacific species to study, and he does not seem to be aware that the abundance of the under-fur greatly depends on the season and age of the animal when collected; and unfortunately he seems to have had no specimens or skulls of the southern species to enable him to study their characters; yet with these limited materials he has ventured to propose a revision of the species of Otariadæ, and, from the same cause, has suggested the uniting of many incongruous species together. It may be very true that zoologists have erred (myself among the number) in making too many genera and species; but the correction of this error requires as much study and consideration of the entire subject as have been used in their determination; and science is not advanced by hasty alterations founded on a few specimens.

The Eared Seals are collected for their oil and skins. Most of the species have very dense under-fur of soft erect hairs between the bases of the longer hairs. These are called "Fur-Seals;" and the skins, when deprived of their long hairs, are very valuable. The dressed furs of the various species and localities are of very different commercial and economic value. The skins of *Neophoca lobata* (of Australia) and *Phocarctos Hookeri* (of the Southern Ocean), being nearly destitute of this under-fur, are called *Hair-Seals* by the sealers. Their skins are of little comparative value, as they are only used like the skins of the Earless Seals (Phocidæ).

Synopsis of the Genera.

Section I. *Palate produced behind to a line even with the condyles of the jaw. Grinders* $\frac{6}{5}$. $\frac{6}{5}$. *Under-fur sparse.* Sea-lions.

Tribe 1. Otariina.

1. *Otaria.* Antarctic Seas. East and west coast of South America.

Section II. *Palate only extended behind to a line even with the middle part of the zygomatic arch.* Sea-bears.

Tribe 2. Callorhinina. Grinders $\frac{6}{5}$. $\frac{6}{5}$. Skull oblong; face broad, shorter than the orbit; forehead arched. Flap of toes very long.

2. *Callorhinus.* Under-fur abundant. North-west coast of America.

Tribe 3. Arctocephalina. Grinders $\frac{6}{4}$. $\frac{5}{4}$; face of the skull shelving

in front; the fifth and sixth grinders behind the front of the zygomatic arch. Flap of toes moderate.

3. *Phocarctos.* Grinders large, lobed, the six upper with two notches on the hinder edge. Under-fur sparse. South America.

4. *Arctocephalus.* Grinders thick; crown conical. Under-fur abundant.

Tribe 4. ZALOPHINA. Grinders $\frac{5}{5}.\frac{5}{5}$, large, thick, in a close continuous series; the fifth upper in front of the back edge of the zygomatic arch.

5. *Zalophus.* Grinders large and thick, in a close uniform series. Under-fur sparse. North Pacific.

6. *Neophoca.* Grinders large, thick, all equal, in a continuous uniform series. Under-fur sparse. Flap of toes very short. Australia.

Tribe 5. EUMETOPIINA. Grinders $\frac{5}{5}.\frac{5}{5}$, more or less far apart; the hinder upper behind the hinder edge of the zygomatic arch, and separated from the other grinders by a concave space.

7. *Eumetopias.* Under-fur sparse. Flap of toes very short. West coast of North America.

8. *Arctophoca.* Under-fur abundant. Flap of toes long. West coast of South America.

Sect. I. *The palate produced behind to a line even with the condyles. The palatine surface of the maxillaries extending behind the teeth and with its posterior processes very long. It is deeply concave behind, and becomes deeper as the animal increases in age. The hinder nostril is short, with a truncated front edge. Flap of toes rather long.* Sea-lions.

Tribe I. *OTARIINA.*

Otariina, *Gray, Ann. & Mag. N. H.* 1869, vol. iv. p. 269.

1. OTARIA.

Grinders $\frac{6}{5}$. In the adult skulls the fourth upper grinder is under the front edge of the orbit, and the sixth or last in a line with the back edge of the zygomatic arch. The hinder edge of the palate is rather in front, on the line of the condyles. The teeth in the younger skull are more lobed than in the adult; the upper grinders are also differently disposed: the third upper grinder is under the front edge of the orbit, and the fifth tooth is in a line with the back edge of the zygomatic arch, and the last or sixth tooth is far behind it (see skull, Cat. S. & W. p. 58, f. 18). This change is remarkable, as the teeth of the young and the adult *Zalophus Gilliespii* are similar in number and position.

Otaria (subg. Otaria), *Peters, Monatsb.* 1866, p. 263.
Otaria, *Gray, Cat. Seals & Whales*, p. 57; *Ann. & Mag. N. H.* 1866, vol. xviii. p. 230; *Gill*, and *Peters.*
Platyrhynchus, *F. Cuvier.*

1. Otaria jubata. *Sea-lion.*

Fur dark brown; cheeks, temples, and sides of the forehead black; neck greyish brown; back of the neck yellow-brown; belly dusky black; hairs flat, tapering, dark brown, yellow, and whitish intermixed, without any under-fur.

Sea-bear, *Illustrated London News*; *Boy's Own Book.*
Otaria jubata, *label in Zoological Gardens*, 1865; *Gray, Ann. & Mag. Nat. Hist.* 1868, i. p. 109; *Murie, P. Z. S.* 1869, p. 101, t. viii. (male, female, and young); *Abbott, P. Z. S.* 1868, p. 190; *Sclater, P. Z. S.* 1868, p. 528; *Peters, Monatsber.* 1866, p. 262.
Otaria leonina, *Peters, Monatsb.* 1866, pp. 264, 665; *Gray, Cat. Seals & Whales*, p. 59, f. 18.
Otaria Godeffroyi, *Peters, Monatsb.* 1866, p. 266, t. 1.
Otaria Byronia, *Peters, Monatsb.* 1866, pp. 269 & 666.
Otaria (Phocarctos) Ulloæ, *Peters, Monatsb.* 1866, p. 270.
Otaria Ulloæ, *Tschudi, Fauna Peruana*, pp. 135, 136, t. vi.
Otaria (Otaria) Ulloæ, *Peters, Monatsb.* 1866, pp. 667 & 671.

Inhab. South America, Falkland Islands, Chili.

The oldest of the three adult skulls in the British Museum differs from the other two in the pterygoid processes of the hinder edge of the palate being closer together than in the rest; but this character seems to depend on the greater age of the animal, as it differs slightly in the other two specimens. In all the younger specimens, varying greatly in size, the pterygoid processes are far apart.

Dr. Peters considers (1) *Platyrhynchus leoninus* of F. Cuvier, (2) *Phoca Byronia* of Blainville, and (3) an adult specimen which is in the Hamburg Museum, and of which he described and figured the skull as *O. Godeffroyi*, to be distinct species. I cannot see any difference between the skull in the College of Surgeons, on which *Phoca Byronia* was founded, and those in the British Museum; and the figure of the skull described as *O. Godeffroyi* is very similar to the skull in the British-Museum collection which I have called *O. jubata*.

This animal has the harsh fur without any under-fur of *Phocarctos Hookeri*; but it entirely differs from that animal in the colour of the fur. This cannot arise from the greater age of the animal, as it is not nearly so large as the half-grown *P. Hookeri* in the British Museum.

In the dark blackish-brown colour of the fur and the pale-brown colour of the nape, and in the absence of the under-fur, this Seal resembles the adult *Neophoca lobata* from Australia; but in that species the pale colour extends all over the crown, while in the young male *Otaria jubata* there are only a few paler scattered hairs on the middle of the crown and nose.

Dr. Murie represents the skull of a nearly full-grown male and of a female nearly of the same age (P. Z. S. 1869, p. 103. f. 1, 2). They greatly differ, the nose and the palate being much wider in the male than in the female, and the teeth in the male (but this may be only an individual peculiarity) were much worn down.

He observes, "the whole of the palate is much narrower than in the male of the same size, especially in the maxillary region, and the teeth are much weaker and more sharply pointed."

He observes, "The young of both sexes are alike of a dark brown or very deep chocolate colour. The males about a year old retain somewhat of the chocolate tint of their youth, which, however, is paler, and subsequently changes annually as the coat is shed. The females of equal age assume a dark grey hue dorsally, while the abdominal parts are light yellowish. As they grow older they alter little.

"Males a couple of years old or more become of a rich brown shade on the back and sides, and lighter or yellowish beneath. Old males alone are maned.

"There is a sparse underwool on the young, which sensibly diminishes with age.

"The skulls of the adult male and female differ considerably, the latter being comparatively the narrower of the two—the former possessing a somewhat different form of teeth, besides proportionally immense canines.

"The teeth of *Otaria jubata* are subject occasionally to a peculiar wearing, of a median constricted character.

"Between the female and male of this species there is a wide difference as regards the stretch of the pectoral flippers. In the skin of the male the breadth from tip to tip of the fore flippers is equal to or greater than the length of the body; in the female the reverse obtains. This fact points to greater strength and swimming-power of the former."

Sect. II. *The palate rather produced behind. The front edge of the hinder nasal opening in a line with the middle of the zygomatic arch.* Sea-bears.

Tribe II. *CALLORHININA.*

Grinders $\frac{6}{5} \cdot \frac{6}{5}$. Skull oblong; face broad, shorter than the orbit; forehead arched. See Cat. S. & W. p. 45, f. 16 (skull).

Callorhinina, *Gray, Ann. & Mag. N. H.* 1869, vol. iv. p. 269.

2. CALLORHINUS.

Skull elongate; forehead rounded in front of the orbit, rather swollen. Palate rather concave, as wide in front as at the end of the tooth-line, rather narrowed behind. The sixth upper grinder just behind the hinder edge of the zygomatic arch; the grinders moderate, fifth and sixth upper and the fifth lower with two diverging roots. Front flapper small, narrow. Flap of toes very long.

Callorhinus, *Gray, P. Z. S.* 1859, p. 359; *Annals & Mag. N. H.* 1866, vol. xviii. p. 234; *Cat. S. & W.* p. 44, f. 16 (skull); *Peters.*
Arctocephalus, *Gill*!

1. **Callorhinus ursinus.** *Northern Sea-Bear.* B.M.

Phoca ursina, *Linn.*; *Pander & D'Alton*, t. 7. f. 1 (not good).
Otaria (Callorhinus) ursina, *Peters, Monatsb.* 1866, pp. 273 & 672.
Otaria Stelleri (part.), *Lesson & Müller.*
Callorhinus ursinus, *Gray, P. Z. S.* 1859, p. 359, t. 58 (skull); *Ann. & Mag. N. H.* 1866, xviii. p. 235; *Cat. Seals & W.* p. 44, f. 16 (skull); *Allen, Bull. Mus. Comp. Zool.* ii. pp. 44 & 73, tab. 2 & 3. figs. 1–8.
Arctocephalus ursinus, *Gill, Proc. Essex Inst.* vol. v. 1866, p. 13 (not *F. Cuvier*).
Young. Arctocephalus monteriensis, *Gray, P. Z. S.* 1859, p. 358 (skin only).
Arctocephalus californianus, *Gray, Cat. Seals & Whales*, p. 51 (skin only).

Inhab. Kamtschatka. B.M.

Tribe III. *ARCTOCEPHALINA.*

Grinders $\frac{6}{5}$. $\frac{6}{5}$; face of the skull shelving in front; the fifth and sixth grinders behind the front of the zygomatic arch.

3. PHOCARCTOS.

The skull elongate, forehead flat. The palate concave, deep, with a thickened margin on each side in front, widest in the middle part of the tooth-line, and gradually narrowed behind the teeth; the internal nares oblong, longer than broad, truncate in front, the front edge in a line with the orbital process of the zygomatic arch. Grinders large, compressed; the fifth and sixth upper behind the back edge of the zygomatic arch. The grinders have compressed roots; some of them have a very indistinct longitudinal groove on the side; the fifth upper grinder has two distinct roots. The ear-bones scarcely prominent, with a flat lower surface. Flap of toes moderate.

I have not seen an adult skull of this genus. The skulls described are 10 inches long, but the bones are not knit (see Cat. S. & W. p. 47, f. 17).

Arctocephalus § II., *Gray, Proc. Zool. Soc.* 1859, p. 109.
Phocarctos, *Gray, Ann. & Mag. N. H.* 1866, vol. xviii. p. 234.
Otaria (part.), *Allen, Bull. Mus. Comp. Zool.* ii. p. 44.

1. **Phocarctos Hookeri.** *The Southern Hair-Seal.* B.M.

Fur brown-grey, slightly grizzled, pale, nearly white beneath; hairs short, close-pressed, rather slender, flattened, black, with whitish tips, the tips becoming longer on the under part of the sides; feet reddish or black; whiskers black or whitish.

Young pale yellow, varied with darker irregular patches; length 18 inches. B.M.

Arctocephalus Hookeri, *Gray, Zool. Erebus and Terror*, t. 14, 15

(skull); *Cat. Seals B. M.* p. 45. f. 15; *P. Z. S.* 1859, pp. 109, 360, *Cat. Seals and Whales B. M.* pp. 53, 54.
Arctocephalus falklandicus, *Burmeister, Ann. & Mag. N. H.* 1866, xviii. t. 9. f. 1, 2, 3, 4 (skull only).
Otaria (Phocarctos) Hookeri, *Peters, Monatsb.* 1866, pp. 269 & 671.
Phocartos Hookeri, *Gray, Ann. & Mag. N. H.* 1866, vol. xviii. p. 234 (the Hair-Seal of the sealers).
Otaria jubata (part.), *Allen, Bull. Mus. Comp. Zool.* ii. p. 45.

Young or albino? entirely cream-coloured, about 2 feet long.

Eared Seal, *Pennant, Quad.* ii. p. 278.
Phoca flavescens, *Shaw, Gen. Zool.* i. p. 200, t. 73 (from *Pennant*).

Inhab. Falkland Islands and Cape Horn.

Pennant, in his 'Quadrupeds,' describes an Eared Seal, rather more than 2 feet long, the whole body of which was covered with longish hair of a whitish or cream-colour; it was brought from the Straits of Magellan, and preserved in Parkinson's Museum on the south side of Blackfriar's Bridge (see "Eared Seal," Pennant's Quad. ii. p. 278). Dr. Shaw, in his 'General Zoology,' gave the name of *Phoca flavescens* to this species, and figured it (i. p. 260, t. 73).

This is very probably the young of the Hair-Seal of the Falklands, described by me as *Arctocephalus Hookeri*, which is of a pale-yellowish colour. Pennant does not mention the want of the under-fur.

Dr. Burmeister observes:—"We have in the Museum [at Buenos Ayres] a young half-grown specimen [of *Arctocephalus falklandicus*] nearly 3 feet long. From this I have taken the skull, of which I send you a description and drawings" (Ann. N. H. 1866, xviii. p. 99, t. 9. f. 1, 2, 3, 4). From the comparison of the figures, and especially of the teeth and the form of the palate, with our older skull of *Arctocephalus Hookeri*, I have little doubt that it is the skull of a specimen of that species before the grinders were all developed. It is not the skull of *Otaria jubata*, which the other specimen he called *A. falklandicus* is, as proved by the form and position of the hinder nasal openings. The figure of the young skull differs from the older skull of *A. Hookeri* in the British Museum in having a notch in the middle, while the older skull of *A. Hookeri* has a conical prominence in the same place. Such differences are found in skulls of Seals at different ages.

The skull of the young animal described and figured by Dr. Burmeister as *Arctocephalus falklandicus* (Ann. & Mag. N. H. 1866, xviii. p. 99, t. 9. f. 1 & 2), is probably the young skull of this species. It agrees with it in the elongated form of the skull, and in the large size and great development of the processes of the orbits.

Dr. Murie regards *Otaria Philippii* as founded on the skull of this species (P. Z. S. 1869, p. 108).

Mr. Allen, on the contrary, includes *Otaria Hookeri* as a synonym of *Otaria jubata*. One could not have a better proof of the want

that Mr. Allen had of more materials when he undertook a revision of the family.

4. ARCTOCEPHALUS.

Arctocephalus, *F. Cuvier, Peters.*

The face of the skull elongate, forehead flat. The palate concave, especially in front, with a thickened margin on each side near the teeth, and then narrowed behind; the internal nasal opening elongate, longer than broad, narrow and arched in front, the edge in a line with the orbital process of the zygomatic arch, which is large and well developed. Flap of toes moderate.

In the adult skull of *A. antarctica*, from the Cape, the fifth hinder grinder has only very short rounded callous roots, which are slightly divided into two lobes; and the hinder sixth upper grinder seems to have a root of the same character. But not having any skulls of younger animals, I am not able to describe what are the forms of the roots of these two teeth in the younger state.

In the skulls of the older specimens (which are not adult, as they have the sutures between the bones still distinct), the fifth and sixth upper grinders have two distinct diverging roots.

* *The fifth and sixth upper grinders with two roots* (?); *the sixth upper partly behind the hinder edge of the zygomatic arch.* Arctocephalus. (Africa.)

1. Arctocephalus antarcticus. *The Cape Fur-Seal.*

Phoca antarctica, *Thunb. Mém. Acad. Pétersb.* iii. p. 322; *Fischer's Synop.* p. 242.
Arctocephalus schisthyperoës, *Turner, Journ. Anat.* 1868, p. 113, f. .
Arctocephalus schistuperus, *Günther, Zool. Record*, 1868, p. 20.
Arctocephalus antarcticus, *Gray*; *Allen, Bull. Mus. Comp. Zool.* ii. p. 45.
Arctocephalus Delalandii, *Gray, P. Z. S.* 1859, t. 69 (skull); *Ann. & Mag. N. H.* 1866, vol. xviii. p. 235; *Cat. S. & W.* p. 52.
Phoca ursina, *Cuvier, Oss. Foss.* t. 219. f. 5.
Arctocephalus ursinus, *F. Cuvier, Mém. Mus.* vol. xi. p. 205, t. 15, no. 1. *a*, *b*, *c* (skull).
Otaria ursina, *Nilsson.*
Halarctus Delalandii, *Gill, l. c.* p. 7.
Otaria (Arctocephalus) pusilla, *Peters, Monatsb.* 1866, pp. 271 & 671.
Junior. Petit Phoque, *Buffon, H. N.* xiii. t. 53, = Phoca pusilla, *Schreb.*

Inhab. South Africa, Cape of Good Hope.

The two adult skulls in the British Museum differ greatly in the width of the hinder nasal opening, in the form of the hinder lower lateral processes of the occipital bone, in the form of the back of that bone, and in the shape of the condyles.

The skull from the Cape of Good Hope, in the Museum of the University of Edinburgh, was described and figured by Dr. Turner under the name of *Arctocephalus schisthyperoës*, in the 'Journal of Anatomy and Physiology,' vol. iii. p. 113. The name

is changed to *A. schistuperus* by Dr. Günther in the 'Zoological Record' for 1868, p. 20. It is evidently the skull of a half-grown animal, with all its teeth developed, but with the sutures of the bones still apparent. It agrees in every respect with what I should expect to be the form and structure of the skull of *Arctocephalus antarcticus* from the Cape; but unfortunately the two skulls of that Sea-bear from the Cape which are in the British Museum are from old animals; and the specimen figured by Cuvier, Oss. Foss. v. 220, t. 18. f. 5, is also adult. It differs from the skulls of the two adult specimens of that species in the British Museum in the hinder nasal aperture being much extended forwards and gradually tapering to a point in front, which reaches to the transverse palato-maxillary suture. This peculiarity in the form of the palate, which Prof. Turner has not observed in any other seal-skull, seems to have induced him to regard it as a distinct species. From the examination I have made of the skulls of Seals in the Museum and other collections, I am induced to believe that it is an individual abnormality of *Arctocephalus antarcticus*. I have observed a similar malformation in the palates of two other species. I was myself misled by their structure, before I met with the other examples, to regard a skull with such a deformity as a distinct species.

At one time I thought that it might be a peculiarity of the young state, as it had up to that time only been observed in skulls of half-grown animals. It occurs in half-grown specimens of *Euotaria nigrescens*; but the skulls of the very young specimens of this Seal in the British Museum have the front edge of the hinder nasal opening truncated and slightly arched in form, with well-developed square palatine bones united by a central suture just as in the adult, but broader and straighter.

It was this observation that induced me to return to my original opinion, that the skull which I had at first regarded as a young skull of *Arctocephalus monteriensis* (Proc. Zool. Soc. 1859), and then as a separate species under the name of *A. californianus* (Cat. Seals and Whales, p. 51), was only a monstrosity of *A. monteriensis*, as I did in the Ann. & Mag. Nat. Hist. 1866, xviii. p. 232; and I am now induced to believe that *Arctocephalus schisthyperoës* is only an imperfectly developed skull of *A. antarctica*.

Dr. J. R. Forster, in Cook's voyage in 1775, observed the Eared Seal at the Cape of Good Hope, and called it *Phoca ursina*. Believing it to be the same as the Sea-bear he had observed in New Zealand, Thunberg, in his list of Cape Mammalia in the third volume of the 'Transactions of the St. Petersburg Academy,' iii. 322, notices this animal under the name of *Phoca antarctica* (see Fischer, Syn. Mam. p. 242). Dr. Peters has applied the name of *Otaria pusilla* to this species, believing it to be the *Petit Phoque* of Buffon, which has been named *Phoca pusilla* by Schreber, and had before been named *Phoca parva* by Boddaert. Buffon says that it came either from India or the Levant; but it is not by its descrip-

tion to be distinguished from a young specimen of almost any of the species. It is as likely to have come from the Falkland Islands as from the Cape, as the French had traffic with Les Iles Malouines, as they call them.

M. de Buffon describes a small Eared Seal, which he calls a "second Phoque" (vol. xiii. p. 341, t. 43, where it is named "le petit Phoque"), which, he was assured, came from India, but very probably came from the Levant; and he considers it adult, because it has all its teeth. It is only one-fifth of the size of the Seal of the European seas (Hist. Nat. xiii. p. 344). He further speaks of it as "le petit Phoque noir des Indes et du Levant" (p. 345). It is evidently a young Eared Seal. The figure is probably from the skin, with the bones of the toes and jaws, presented to the cabinet by M. Mauduit (mentioned at p. 433. n. 1273), and said to have come from India.

The specimen Buffon figured, then being in the Paris Museum, was thus described by Cuvier (Oss. Foss. v. p. 220):—"Cet animal a deux pieds de long; ses oreilles sont grandes et pointues; son pelage est fourré, luisant, d'un brun noir très-foncé et a sa nuance blanchâtre. Le ventre seul est brun-jaunâtre." The teeth show that it is young.

The figure and description of the *Petit Phoque* of Buffon have had the following names given to them:—

Little Seal, *by Pennant and Shaw.*
Phoca pusilla, *Schreber, Säugeth.* 314 (*Peters*).
Phoca parva, *Bodd. Elench.* 78.
Otaria pusilla, *Desm. N. Dict.*
Otaria Peronii, *Desm. Mamm.*

Fischer, in his 'Synopsis,' under *Phoca pusilla*, p. 252, gives the Cape of Good Hope and Rotteness Island, on the coast of Australia, as the habitat of the species.

The description of Cuvier much more nearly fits that of the young *Arctocephalus nigrescens* from the Falkland Islands. The fur of the young Cape Seal is dark, black above and below; the hairs are slender, and brown (not whitish) at the base; and the underside is not yellowish brown; so that it is very doubtful if it is the young of the Cape Seal.

Dr. Peters, believing Buffon's specimen to be a young Cape Seal, changed the name of *Delalandii* to *pusilla*.

In the Museum are three states in flat skins:—

1. Adult male, with slight mane, called in the sale-catalogue "large-wig." Fur whitish, with a few intermixed black hairs; under-fur short, reddish. B.M.

2. Adult, without the mane, called in the sale-catalogue "middling." Fur reddish white, grizzled with scattered black hairs; underside of the body darker, reddish brown; under-fur short, reddish. B.M.

3. Young, about 18 inches long, called in the sale-catalogue "black pup," from the Cape of Good Hope. Fur black, polished, soft, smooth, without any grey tips, rather browner black be-

neath; under-fur brown, very sparse; hairs slender, polished, black, with very slender brown bases. B.M.

** *The fourth, fifth, and sixth upper grinders with two distinct diverging roots: the fifth in a line with the hinder edge of the zygomatic arch.* Euotaria. (America.)

2. **Arctocephalus nigrescens.** *The Southern Fur-Seal.*

Arctocephalus nigrescens, *Gray, Zool. Erebus and Terror*, t. ; *P. Z. S.* 1850, pp. 109, 360; *Cat. Seals and Whales*, p. 52; *Gerrard, Cat. of Bones*, p. 147.
Arctocephalus (Euotaria) nigrescens, *Gray, Ann. & Mag. Nat. Hist.* 1866, xviii. p. 236.
Arctocephalus falklandicus, *Gray, Cat. S. & W.* p. 55; *Allen, Bull. Mus. Comp. Zool.* ii. p. 45.
Otaria (Arctocephalus ?) falklandica, *Peters, Monatsb.* 1866, p. 273.
Otaria (Arctophoca) falklandica, *Peters, Monatsb.* pp. 371 & 671.
Otaria falklandica, *Sclater, P. Z. S.* 1868, p. 528; *Abbott, P. Z. S.* 1868, p. 192.
Otaria jubata (young), *B.M.*
Euotaria nigrescens, *Gray, Ann. & Mag. Nat. Hist.* 1868, p. 104.
Otaria nigrescens, *Murie, P. Z. S.* 1869, p. 106.

Inhab. Falkland Islands, Volunteer Rock (*Capt. Abbott*).

The two skulls of this species in the British Museum agree in most particulars; but they differ considerably in the form of the hinder nostrils. The larger one is without its upper teeth, but the forms of the roots are well exhibited by their sockets; the front edge of the hinder nasal opening is produced rather further forward, and is acutely angular. The other skull, which is rather smaller and has the teeth in good condition, has the hinder nasal opening with a slightly arched, nearly truncated, front edge.

Dr. Peters refers *Phoca falklandica* (Shaw, Zool. i. p. 256) and *Otaria falklandica* (Hamilton, Ann. & Mag. N. H. 1839, p. 81, t. 4; Jardine, Nat. Lib. vi. p. 271, t. 25) to this species. But as neither Dr. Shaw nor Dr. Hamilton describes the number or position of the teeth, it is not possible to determine if this is the *Fur-Seal* of the sealers, collected at the Falkland Islands, more especially as the fact of the skull coming from the Falkland Islands is not well ascertained. See the other synonyma which have been established on the sealers' descriptions and figures or the skins collected for the furriers at the Falkland Islands (Gray, Cat. Seals and Whales, pp. 55, 56). Dr. Hamilton, who prides himself on his figure, represents the hind legs as extended behind: but they look very awkward in that position, the stuffer having evidently had a difficulty in extending them.

The hair of *A. nigrescens* is considerably longer than that of *A. cinereus*, but not so harsh, the fur of the half-grown *A. nigrescens* being longer, sparse, flat, rather curled at the end, giving it a crispness to the feel; while the hairs of the very young specimens are abundant, nearly of equal length, forming an even coat that is soft and smooth to the touch.

Capt. Abbott's young specimen in the British Museum chiefly differs from the adult specimen in the same collection in the hairs being longer, more erect, and with minute white tips, and in the face, throat, and chest being rufous brown; but this reddish colour is common to the young of several Sea-bears.

The skulls from Desolation Island, on the south-west coast of Patagonia, presented to the Anatomical Museum of the University of Edinburgh by the late Professor Goodsir, evidently belong to *Euotaria nigrescens*, the usual Fur-Seal of the Falkland Islands and other parts of the coast of South-west America. Two of the skulls are from adult animals, are without the lower jaws, and have only a few worn and broken teeth, having been rolled on the beach.

The other skull is of a young animal, exactly similar to the skull of a young *Euotaria nigrescens*, n. 1013 *e*, in the British-Museum collection. The front edge of the hinder nostrils is as arched as in that specimen; the teeth are rather more developed than in our skull; they have a well-marked central lobe and a distinct small acute tubercle on the front edge of the cingulum.

The two adult skulls are very like the adult skull of *E. nigrescens*, 1013 *d*, in the British Museum; but the opening of the internal nostrils is narrower, and their front edge in one is not nearly so angular, and in the other it is rather more arched than in either of the other two skulls, showing that the size of the posterior nasal aperture and the form of its front edge vary in different specimens of this species.

The comparison of the young skull with the more adult one shows that the grinders change their position considerably as regards the front edge of the hinder nasal opening. In the young skull of *Euotaria nigrescens* the hinder end of the tooth-line is very near (not a quarter of an inch from) a line level with the front edge of the internal nasal opening, and the hinder part of the palate in front of the aperture is nearly as broad as the middle of the palate: in the adult skull the hinder end of the tooth-line is a full inch from the front edge of the internal nasal opening, the hinder part of the palate is contracted toward the internal nostril, and the internal nasal opening is lengthened and narrowed; but the real position of the teeth, as compared with the front part of the zygomatic arch, is little altered, though the form of the palate gives them the appearance of being more changed than they really are.

These skulls are interesting as showing that *Euotaria nigrescens*, like *Otaria leonina* and *Morunga elephantina*, is, or was, common to the Falkland Islands and the west coast of South America.

The chief character by which the adult skull of *Euotaria nigrescens* can be distinguished from the adult skull of *Arctocephalus antarcticus* is, that the hinder or fifth upper grinder and the penultimate or fourth are placed rather in front of the hinder edge of the front part of the zygomatic arch; but the position of the teeth is most distinctive in the skull of the young animal, and loses much of its importance in comparing old skulls together, unless the skulls

and teeth are very accurately compared; and even then the distinction is more imaginary than real.

I cannot understand Capt. Abbott's account of this species. He says that "the full-grown Seal is about the size of the common English Seal. The largest skin I have ever seen I do not think measured more than 4 feet in length, perhaps hardly so much. The hair differs in colour, being sometimes grey, and at other times of a brownish tint; that of the young is of a darker brown colour." All this agrees better with the true *O. falklandica*; but yet he says the skin of his half-grown specimen is now in the British Museum, and that skin is undoubtedly *Euotaria nigrescens*. Has Mr. Abbott confounded the two species in his mind? Or did he forget the animal? for he informed me that there were no Sea-elephants now living on the island. (P. Z. S. 1868, p. 190.)

"The bones of the pectoral limb of the Fur-Seal of commerce differ from those of the Sea-lion."—*Murie*, P. Z. S. 1869, p. 109.

See Lecomte's account of the habits of these animals, P. Z. S. 1869, p. 106.

The British Museum contains the skin and skull of a large blackish Eared Seal, nearly 6 feet long, that was purchased of a dealer as "a Fur-Seal from the Falkland Islands;" but, as the dealers seem always to give that as the habitat for all seal-skins with a distinct under-coat that come into their possession, I have quoted the habitat with doubt. When occupied in describing the Seals of the southern hemisphere for the 'Voyage of the Erebus and Terror,' I named the Seal *Arctocephalus nigrescens*, and had the skull figured under that name; but the plate has not yet been published, though copies of it have been given to Dr. Peters and other zoologists. In the 'Proceedings of the Zoological Society' for 1859, pp. 109, 360, and in the 'Catalogue of Seals and Whales,' I described the skull of this species. There is also in the Museum a skull of a younger animal of the same species.

Capt. Abbott, in 1866, sent to the British Museum a large and a small Seal from the Falkland Islands. The large one was examined and determined to be the southern Sea-lion (*Otaria jubata*). The small one, nearly 3 feet long, was very similar in external appearance; and as the teeth, which could be seen without extracting the skull, showed that it was a young animal, it was regarded as the young of the Sea-lion, and it was stuffed without extracting the skull, and labelled as such. This specimen has been examined by several zoologists, among the rest by Dr. Peters, when engaged with his paper on Eared Seals, and has passed unchallenged until this time, thus showing how difficult it is to distinguish these animals by their external characters alone.

Capt. Abbott, who is now residing in England, informed me that the smaller specimen was the Fur-Seal of the Falkland Islands, that it grows to about half as long again as the specimen sent, and that the old males are grey from the tips of the hairs. I have therefore had the skull extracted from the specimen; and there is no doubt that it is quite distinct from the Sea-lion (*Otaria jubata*);

and, on more careful examination of the skin, I have little doubt, from the colour and the character of the fur, that it is a young specimen of the Seal that I described as *Arctocephalus nigrescens*. It is interesting as confirming the accuracy of the habitat that I received with that specimen, and which until this time I considered doubtful, as Pennant and others describe the Falkland Island Fur-Seal as grey, and white beneath.

Dr. Peters, on the authority of this habitat (which I have always quoted with doubt), has given the name of *Arctophoca falklandica* to the animal and skull on which I had established my *Arctocephalus nigrescens*.

In the British Museum there is the skin of a very young Seal, which was presented by Sir John Richardson as the Falkland Island Fur-Seal, with the observation appended that the adult is 5 feet long, and its skin is worth fifteen dollars. It is without its skull. The fur of this young Seal is dark brown, reddish beneath, and very like that of the young specimen sent by Capt. Abbott; but the hairs are smoother, and the white tips to them are longer and more marked, giving the animal a more grizzled appearance.

There is another young Eared Seal, very like the former, which was received with General Hardwicke's Collection (who, no doubt, purchased it of a dealer), said to have come from the Cape of Good Hope. I suspect this habitat must be erroneous; for it is very unlike what I recollect of the young Cape Eared Seals, which are called "Black Dogs," on account of the blackness of their colour. Unfortunately we have no specimen of the latter in the Museum collection. General Hardwicke's specimen only differs from Sir John Richardson's in being less punctulated with white; fewer hairs have a white tip, and the tip is shorter.

Both these young specimens differ from the half-grown one obtained from Capt. Abbott, in the fur being softer and smooth to the touch; and Capt. Abbott's specimen differs from the adult in the length and greater crispness of its fur, the fur of the old one being harsh and hard and closer pressed.

In the first essay, Dr. Peters places *Phoca falklandica*, Shaw, and *Otaria nigrescens* together, with doubt, observing that one was known from the skin, and the other by the skull, overlooking the fact that the name *nigrescens* implied that I had seen the colour of the fur, which was not that given by Shaw to his animal; in his second essay, Dr. Shaw's, Dr. Burmeister's, and my animal are all classed together without any doubt.

The skull of Capt. Abbott's Fur-Seal from the Falkland Islands shows that it was a very young animal, which had only developed its first grinders, the permanent series being developed below them. The tentorium is bony and well developed. The teeth are the same in position and number as they are in the adult skull; and the upper ones, as far as developed, are small and conical, except the fifth upper grinder, which is largest, triangular, with a single subconical lobe on the base of the hinder edge of the cone. The lower canines are small, scarcely larger than the cutting-teeth, which are

nearly uniform in size. The lower grinders are of a much larger size than the upper ones in the adult skull, as if they belonged to the permanent series: they are of the same form as the teeth in adult skulls; but the central cone is higher and more acute, and the anterior and posterior lobes at the base of the cone are more developed and acute, the lobes of the last or fifth grinder being larger and rather on the inner surface of the tooth.

The skull of Capt. Abbott's animal is evidently not the same as the skull of a young Eared Seal described and figured by Dr. Burmeister as the skull of *Arctocephalus falklandicus* from the mouth of the Rio de la Plata, in the Ann. & Mag. Nat. Hist. ser. 3, vol. xviii. p. 99, t. 9, which, from the appearance of the grinders, I suspect is the young skull of *Phocarctos Hookeri*, the Hair-Seal of the Falkland Islands. There is a considerable difference in the proportions of the skull sent by Capt. Abbott from those of the one figured by Dr. Burmeister. In Capt. Abbott's specimen the brain-case, from the back edge of the orbit to the occiput, is as long as the length of the face, from the same edge of the orbit to the end of the nose. In Dr. Burmeister's figure, the face from the same point is much longer than the brain-case.

*** *Fourth, fifth, and sixth upper grinders with two diverging roots; the fifth upper grinder entirely behind the hinder edge of the zygomatic arch. The palate narrow.* Gypsophoca. (Australia.)

3. Arctocephalus cinereus. *Australian Fur-Seal.*

Otaria (Arctocephalus) cinerea, *Peters, Monatsb.* 1866, pp. 272 & 671.

Arctocephalus nigrescens, *b & c, Gerrard, Cat. Bones B.M.* p. 147.

Black Seal, Otaria, *Cat. Sidney Museum*, ii. p. 36.

Arctocephalus cinereus, *Gray, Cat. Seals and Whales*, p. 56; *Ann. & Mag. N. H.* 1866, xviii. p. 236; *Allen, Bull. Mus. Comp. Zool.* ii. p. 45.

Inhab. Australia (*John Macgillivray*).

Black, greyer beneath; under-fur abundant, reddish brown.

There are the stuffed skin, with its skull, and the bones of the face of another young specimen of this Seal in the British Museum, collected in the Australasian Sea by Mr. John Macgillivray.

According to the observations of Dr. Peters, founded on the examination of the typical skulls, *Otaria ursina* of Nilsson and *Otaria Lemarii* of J. Müller (Arch. f. Naturg. 1841, p. 334) include the *Arctocephalus antarcticus* from South Africa and *A. cinereus* of Australia.

Otaria Stelleri of Schlegel (Fauna Japonica, t. 22. f. 55) includes both the Australian Eared Seals, viz. *Arctocephalus cinereus* and *Neophoca lobata*; and it is quite distinct from the *Otaria Stelleri* of Lesson and J. Müller, which is a combination of the Sea-bear and Sea-lion of Steller (that is to say, *Eumetopias Stelleri* and *Callorhinus ursinus*).

The males of these animals are described as twice as long and

broad (that is, four times as large) as the females. This may explain the difference in size of the skulls from the same localities.

The fur changes its colour as the animal grows, the young being generally black; and the adult males and females also differ considerably in the colour of the fur.

The skulls of the following species are not known :—

4. Arctocephalus Forsteri.

Grinders $\frac{6}{5}$. $\frac{6}{5}$, conical.

Arctocephalus Fosteri, *Fischer*; *Gray, Ann. & Mag. Nat. Hist.* 1868, i. p. 219.

Phoca ursina, *J. R. Forster.*

Inhab. Cloudy Bay, New Zealand.

This animal is only known from Dr. Forster's description and figure.

Mr. Allen observes, "I can see no evidence of the New-Zealand Fur-Seal (of Forster) being specifically distinct from the Fur-Seal of Australia, *A. cinereus* (auct.)."—*Bull. Mus. Comp. Zool.* ii. p. 15.

At the same time Mr. Allen ventures to remark, "perhaps the *A. cinereus* and the *A. antarcticus* are to be referred to the *A. falklandicus*, in which case the habitat of this species is the southern seas generally" (Bull. Comp. Zool. ii. p. 45): but he does not seem to have had specimens of any of the three species; otherwise I do not think he would have ventured upon the observation.

Unfortunately, having no skull or other parts of the Lion Seal of the Auckland Islands (the most southern of the New-Zealand group), we are not able to determine whether it is the same species as the Sea-lion of the southern end of the American continent (*Otaria jubata*), or whether it is the Sea-lion of the southern end of the African continent (*Arctocephalus antarcticus*), or the Sea-lion of the Northern Australian Seas (*Neophoca lobata*).

5. Arctocephalus falklandicus.

Fur very soft, elastic; hairs very short, exceedingly close, slender at the base, thicker above, with close reddish under-fur nearly as long as the hair; the upper surface pale, nearly uniform grey, minutely punctulated with white; hairs brown, upper half black, with minute white tips. The nose, cheeks, temples, throat, chest, sides, and underside of the body yellowish white.

Falkland Seal, *Penn. Quad.* ii.

Phoca falklandica, *Shaw, Gen. Zool.* i. p. 256 (from *Pennant*).

Otaria falklandica, *Desm. Mamm.* p. 252 (from *Pennant*; not *Peters* or *Burmeister*).

Otaria Shawii, *Lesson, Dict. Class. d'H. N.* xiii. p. 424 (from *Pennant*).

Arctocephalus falklandicus, *Gray, Cat. Mam. in Brit. Mus., Seals*, p. 42; *Ann. & Mag. N. H.* 1868, i. p. 103.

Fur-Seal of Commerce (Otaria falklandica), *Hamilton, Ann. & Mag.*

N. H. 1838, ii. p. 81, t. 41; *Jardine, Nat. Lib.* vi. p. 271, t. 25 (not *Peters*).

Otarie de Péron, *Blainville, Journ. de Physique*, xci. p. 298; *Cuvier, Oss. Fossiles*, v. p. 220.

Otaria Houvillii, *Lesson, Dict. Class. d'H. N.* xiii. 425.

Phoca Houvillii, *Fischer, Syn. Mam.* p. 154. These three names are all from the same animal.

Inhab. Falkland Islands (*Abbott*; B.M.); New Georgia.

This is a most distinct species, and easily known from all the other Fur-Seals in the British Museum by the evenness, shortness, closeness, and elasticity of the fur, and the length of the under-fur. The fur is soft enough to wear as a rich fur without the removal of the longer hairs, which are always removed in the other Fur-Seals. Unfortunately the specimen is without any skull; and therefore I cannot give a description of the teeth, or refer it to any of the restricted genera of *Otariadæ*.

Mr. R. Hamilton, in the 'Annals of Natural History' for 1838, ii. p. 81, t. 4, gives the history of the Fur-Seals of commerce and the method of catching them; and he deposited two specimens in the Museum of Edinburgh, which had been procured by Capt. Weddel. Mr. Abbott having informed me that what I had described under the name of *Arctocephalus falklandicus* is not now found in the Falkland Islands, and Mr. Bartlett having shown me an imperfect skin of the same species, which he had obtained from a fur-monger, who informed him that such fur-skins were only received from the Arctic part of the Pacific Ocean, I was induced to request Mr. Archer, director of the Edinburgh Museum of Science and Art, to allow me to examine the Seals described by Mr. Hamilton, which, on examination, proved to be my *Arctocephalus falklandicus*, only differing from the Museum specimen in the fur being considerably darker and harsher; and, from Capt. Weddel's account as given in the 'Annals,' these specimens came from South Georgia or South Shetland. These Seals, which were brought from the Antarctic Ocean, may formerly have inhabited the Falkland Islands, and, like the Sea-lion found there by Pernetty, have been destroyed or driven away. *Arctocephalus Hookeri* is said to be now found in the Antarctic Ocean and the Falkland Islands. In that case it may be the Falkland-Island Seal of Pennant.

The *A. falklandicus* is very like the Fur-Seal from Australia (*H. cinereus*) in the length of the under-fur as compared with the length of the hairs, and also in the colour of the under-fur and hair; but the fur is much softer, and its general colour is much darker, both above and below.

Pennant describes the "Falkland-Island Seal" from a specimen 4 feet long, in the museum of the Royal Society, thus:—"Hair short, cinereous, tipped with dirty white;" "grinders conoid, with a small process on one side near the base." It is to this description that Dr. Shaw applied the name of *Phoca falklandica* (Gen. Zool. i. p. 256). This agrees with a specimen in the Museum in all particulars. It certainly is not the dark blackish-brown Seal which I have described

as the *Arctocephalus nigrescens*, and which Dr. Peters calls *O. falklandica*.

I sent a piece of the fur of this Seal to Dr. Peters to be compared with the fur of *O. Philippii*. He observes, "They appear to be quite different; the wool of *O. falklandica* is fair and has more similarity in colour to the young of *O. cinerea*. The wool of *O. Philippii* is entirely ferruginous red, and the longer hairs are stiffer and have a much shorter grey tip than in *O. falklandica*."

6. Arctocephalus? nivosus. *Cape Hair-Seal.* B.M.

Fur very short, close-pressed, black, varied with close, small, often confluent, white spots; underside of the neck with a few scattered white hairs; belly red-brown (nearly bay); hairs short, thick, of one colour to the base; under-fur none, except a very few hairs on the crown of the head. Skull unknown.

Arctocephalus? nivosus, *Ann. & Mag. N. H.* 1868, i. p. 219.

Inhab. Cape of Good Hope. B.M.

Length of skin nearly 8 feet; but stretched and flattened.

Dr. Murie (P. Z. S. 1869, p. 108) says that this is only a variety, seasonal, sexual, or of a different age from the specimens hitherto obtained.

Mr. Allen adopts this view, never having seen the specimen, but changes the phrase into "a previously known species" (Bull. Mus. Comp. Zool. ii. p. 18); but neither of them mentions the species to which he refers it.

But surely Mr. Allen does not mean that it is only a variety of the skins which were received with it from the Cape of Good Hope; for, if that were the case, the species would belong to one of his subfamilies, and the variety to the other.

In the form and length of the hair it is very different from *Arctocéphalus antarcticus*; and it is almost destitute of under-fur, except on the crown of the head.

Tribe IV. *ZALOPHINA.*

Grinders $\frac{5}{5}$. $\frac{5}{5}$, large, thick, in a close continuous series; the fifth upper in front of the back edge of the zygomatic arch.

In the younger skull the grinders are placed rather further back, the hinder part of the upper grinder being behind the back edge of the zygomatic arch. The grinders all single-rooted, as the last or sixth grinder in each jaw, which is generally two-rooted, is absent. The face of the skull is considerably produced, and the forehead is flat.

Zalophina, *Gray, Ann. & Mag. N. H.* 1869, iv. p. 269.

5. ZALOPHUS.

Palate concave, narrow in front, wider at the line of the last grinder, and then contracted behind. The hinder nares narrow,

elongate, twice as long as wide, acutely arched in front, front edge in a line with the front edge of the orbital process of the malar bone. Under-fur sparse.

Zalophus, *Gill, Peters*; *Gray, Ann. & Mag. N. H.* 1866, xviii. p. 231.
Arctocephalus § *b***, *Gray, Cat. S. & W.* p. 55.

1. **Zalophus Gilliespii.** *Californian Hair-Seal.*

Otaria Gilliespii, *Macbain.*
Arctocephalus Gilliespii, *Gray, P. Z. S.* 1859, t. 70 (skull); *Cat. S. & W.* p. 55.
Zalophus Gilliespii, *Gray, Ann. & Mag. N. H.* 1866, xviii. p. 231; *Allen, Bull. Mus. Comp. Zool.* ii. pp. 33 & 44; *Gill, Proc. Essex Inst.* 1866, v. p. 13.
Arctocephalus (Zalophus) Gilliespii, *Peters, Monatsb.* 1866, pp. 275 & 671.
? Otaria Stelleri, *Schlegel*, fide *Peters.*

Inhab. North Pacific, South California (Brit. Mus.); Japan (fide *Peters*).

I have not seen any skull or specimens from Japan; so that I am not quite sure that the specimens from the coast of Asia are the same as those from the west coast of America.

6. NEOPHOCA.

Palate concave, broad, as broad before as at the hinder part of the tooth-line, then rather suddenly contracted. The hinder nares broad, rather longer than broad, with the front edge broadly arched, which is further back than the front edge of the orbital process of the zygomatic arch, or malar bone, which is thick and flat. Fur with very little under-fur. Flap of toes moderate.

Arctocephalus § *b****, *Gray, Cat. Seals & Whales*, p. 57.
Otaria, § Zalophus (part.), *Peters.*
Neophoca, *Gray, Ann. & Mag. N. H.* 1866, xviii. p. 231.

1. **Neophoca lobata.** *Australian Hair-Seal.*

Arctocephalus lobatus, *Gray, Spic. Zool.* 1828, t. 4. f. 2 (teeth); *Cat. S. & W.* p. 50; *Zool. E. & T. Mamm.* t. 16, 17. f. 3–5 (skull); *Gould, Mamm. Austr.* iii. t. 49; *Peters.*
Otaria australis, *Quoy & Gaim. Astrol.* t. 14, 15. f. 3, 4 (skull).
Arctocephalus australis, *Gray, Cat. Seals & Whales*, p. 57.
Neophoca lobatus, *Gray, Ann. & Mag. N. H.* 1866, xviii. p. 231.
Otaria (Zalophus) lobata, *Peters, Monatsbr.* 1866, pp. 276 & 671.
Zalophus lobatus, *Allen, Bull. Mus. Comp. Zool.* ii. p. 44.

The upper grinders all single-rooted, the root of the last two (the fourth and fifth) being rather compressed, with an obscure central longitudinal groove on the inner side; the first two grinders of the lower jaw with oblong, the last three with compressed roots, and the fourth and fifth with a slight longitudinal groove on the side.

In the younger skulls the roots of the grinders are more oblong, less compressed, and do not show the lateral grooves, as far as the teeth can be seen without being drawn from the sockets. In the

front part of the younger skull, which was received from Mr. Gould, the teeth are placed rather further back than in the adult skull from North Australia received from Capt. Grey, the hinder part of the fifth tooth being behind the back edge of the zygomatic arch.

Mr. Allen thinks that this is undoubtedly the *O. cinerea* of Desmarest, from Péron; but it is not the *O. cinerea* of Quoy & Gaimard (see obs. on Péron's Seal in the Cat. Seals & Whales, p. 57).

Tribe V. *EUMETOPIINA.*

Grinders $\frac{5}{5}.\frac{5}{5}$, more or less far apart; the hinder upper behind the hinder edge of the zygomatic arch, and separated from the other grinders by a concave space.

Eumetopiina, *Gray, Ann. & Mag. N. H.* 1869, iv. p. 269.

7. EUMETOPIAS.

Eumetopias, *Gill, Peters.*
Arctocephalus § *a***, Gray, Cat. Seals & Whales*, p. 51.

Fur without any under-fur. Palate flattish or rather concave in front, as wide in front as at the end of the tooth-line, and then slightly narrowed behind. Posterior nares oblong, elongate, broadly truncated in front, the front edge being behind the line of the orbital process of the zygomatic arch. The grinders have large oblong roots; the second, third, and fourth upper ones have a subcentral longitudinal groove on the outer side, and a less marked one on their inner surface; the inner side of all but the first of the lower ones are similarly grooved; the fifth upper grinder (or, more properly, the sixth in the normal series) has two distinct roots. The lower jaw much more elongate than that of *Otaria jubata*, the hinder angle more oblique, and the lower margin long and straight. Flap of toes short.

The skull of the young animal, which was sent by Mr. A. S. Taylor to Mr. Gurney from California, and which I first described, with doubt, as *Arctocephalus monteriensis*, junior (P. Z. S. 1859, p. 357), and which in the 'Catalogue of Seals and Whales' I named *A. californianus* (see p. 51), agrees in every respect in its dentition with the large skull which we received from California, and which I described and figured as *A. monteriensis* (P. Z. S. 1859, p. 358, t. 72); but it differs greatly in the form of the hinder nares, which are extended much more forwards, so that the front end, which is very narrow and acute, is much in front of the prominence of the orbit of the zygomatic arch, being, in fact, about in a line with the middle of the lower edge of the orbital cavity.

This skull is evidently that of a very young animal; for the bones are separate; but it has the same number and disposition of the teeth as the large skull. There is the same wide space between the fourth and fifth upper grinders; but there is at the back edge of the fourth grinder, on the right side of the skull, a small pit, from which, no

doubt, a small rudimentary tooth has fallen out; and there is a much wider but shallow pit on the other side, which may have been produced by the loss of a rudimentary tooth; the last upper grinder has a large swollen undivided root. If this is a young skull of *Eumetopias monteriensis*, that species is curious for having the teeth in the old and young skulls in the same situation as regards the bones of the face.

The adult skull and the young one were from the same locality, and, I believe, collected by the same person; and this being the case, I am inclined to regard them as the same, only showing a curious peculiarity in the growth of the animal, and also showing that the form and position of the hinder nostril probably varies as the animal increases in age.

Mr. Gill considers Steller's Sea-bear (*Callorhinus ursinus*) to be the type of M. F. Cuvier's genus *Arctocephalus*, and therefore abolishes *Callorhinus* and gives the new name of *Halarctus* to the true *Arctocephali*—thus unnecessarily adding to the confusion of the generic names of these animals. He fell into this mistake by not observing that *Phoca ursina*, and even *Otaria ursina*, had been applied to several species from very different localities, that F. Cuvier established his genus on the skull of *P. ursina* of Forster, from the Cape, which he (M. Cuvier) had named *Phoca Delalandii*, and that F. Cuvier does not figure a skull of the Sea-bear of Steller: indeed the French collection did not at that time, nor does it even now, possess one; and I feel assured that, if it had, F. Cuvier would, according to his custom, have established for it a genus distinct from *Arctocephalus*, the skulls of the two genera being of such distinct forms.

1. **Eumetopias Stelleri.** *Northern Sea-lion or Fur-Seal.*

Arctocephalus monteriensis, *Gray, Cat. Seals & W.* p. 49; *P. Z. S.* 1859, t. 72 (skull).
Eumetopias californiana, *Gill, Proc. Essex Inst.* 1866, v. p. 13.
Otaria Stelleri, *Gray, Cat. S. & W.* p. 60; *Peters*; *Müller*?
Otaria (Eumetopias) Stelleri, *Peters, Monatsb.* 1866, pp. 274 & 671.
Eumetopias Stelleri, *Gray, Ann. & Mag.* 1866, vol. xviii. p. 233; *Allen, Bull. Mus. Comp. Zool.* vol. ii. pp. 44, 46, tab. 1 & 2 (skull &c.).
Leo marinus, *Steller.*
Phoca jubata, *Pander & D'Alton*, t. 3. f. *d*, *e*, *f* (skull, not good).
Junior. Arctocephalus californianus, *Gray, Cat. S. & W.* p. 51 (skull only).

Inhab. California; Behring's Straits.

The skin of the young specimen which Mr. Gurney gave to the Museum along with what was said by Mr. Taylor to be its skull (see 'Cat. Seals & Whales, p. 51) was the only skin then known to exist in museums; and consequently I described the fur of the genus from this skin as having abundant under-fur (see Proc. Zool. Soc. 1859, p. 358). Dr. Peters having discovered Pander and D'Alton's animal and skull in the Paris Museum, he observed that the adult

animal was entirely without under-fur—a fact which has been confirmed by Mr. Allen, who suggests that the skin of the young received from Monterey is the skin of the young *Eumetopias Stelleri*, which, I think, is very probable. But this only shows the difficulties that must occur in the study of animals from the very imperfect materials which until lately existed.

The Sea-lion of Steller has been one of the zoological paradoxes. Professor Nilsson, like most preceding authors, regarded it as a variety of the *Otaria jubata*; and therefore I supposed it might be a second species of the restricted genus *Otaria*. Dr. Peters has solved the enigma by uniting it and the Seal which I described from California, observing that the skull in the Berlin Museum, figured by D'Alton under the name of "Steller's Sea-lion" (*Phoca jubata*), was received from Kamtschatka, and a second skull of an old male in the Berlin Museum was received from Mr. Brandt as coming from Behring's Straits.

The figure of Pander and D'Alton is so imperfect that it would have been impossible to determine the species it represents without the examination of the original skull; and then one sees that it may have been intended for the species to which it is referred. The same observation is applicable to the figure of the skull of Steller's Sea-bear.

It is to be regretted that these skulls escaped the researches of Professor Nilsson, who visited most museums in Europe to examine the typical specimens.

The specimen of *Callorhinus ursinus* now in the Museum was received from St. Petersburg as *Otaria leonina*, or *Leo marinus* of Steller, from Berhing's Straits; so they evidently confound two species under that name.

8. ARCTOPHOCA.

Arctophoca, *Peters*.

Dr. Peters described this subgenus from a specimen sent from Chili by Dr. Philippi. It chiefly differs from *Zalophus* in the palate being much narrower, but rather wider behind, and the teeth rather far apart. I have not seen any skull agreeing with these characters.

"With abundant under-fur."

According to figures, the form of the skull and the large size of the orbit are very similar to those of *Phocarctos Hookeri*, but the number and form of the teeth are different.

In the 'Monatsbericht,' May 1866, p. 276, t. 2. *a*, *b*, *c*, Dr. Peters described and figured with considerable detail a skull of a Sea-bear (sent to the Berlin Museum by Dr. Philippi, who obtained it at Juan Fernandez Island) under the name of *Otaria Philippi*, forming for it a subgenus which he calls *Arctophoca*. In his revision of that paper, published in the same work for November 1866, p. 671, he places it as a synonym or subspecies of what he calls *Otaria falklandica*, which is my *Arctocephalus nigrescens*, and not

the *Otaria falklandica* of Shaw nor the *O. falklandica* of Burmeister as Dr. Peters supposes, as I have shown above. In this paper he removes *Otaria falklandica* (that is, *nigrescens*) from the subgenus *Phocarctos*, to which he referred it in his first paper, and places it in his subgenus *Arctophoca*.

1. Arctophoca Philippii. *Chilian Fur-Seal.*

Otaria (Arctophoca) Philippii, *Peters, Monatsbericht*, May 1866, p. 276, t. 2 (skull), September 1866, p. 671.
Otaria Hookeri, var., *Murie, P. Z. S.* 1869, p. 108!

Inhab. Juan Fernandez Island (*Philippi*; in Mus. Berl.).

Above black-grey, more greyish yellow on the head and neck, brownish black *beneath*; the base of the limbs of a rusty brown, shining; lips and lower jaw principally rusty brown; hair of beard in six rows, partly black, partly quite white, partly black with white base. The outbristling (prominent bristly) pointed hairs are rusty brown at the base, black at the end, on the back mostly with very short rusty-yellowish points, and on the head and neck with somewhat longer ones. On the sides of the belly the ends of the coarser pointed hairs are either uniformly brownish black, or are very short rusty-red ones. The thick under-hair is rusty red. The hairs on the upper surface of the neck are 22 millims. long; those on the middle of the back 18, and those on the middle of the belly 11 to 12. The dense short hair on the back of the hand extends only to the *middle* of the same, not extending to the ends of the fingers, the ends of which are furnished with very small nails. In like manner, the very similar hair on the back of the foot does not extend to the last "Phalangen?" of the middle toe. The nail of the large outer toe is small, flat, and cut off short outside; that of the fifth inner toe is a little larger and cut off abruptly on the inner side. The very developed long nails of the three centre toes are of the form of keeled tegulæ, and remote along their whole length by the emarginations of the skin of the foot. The skin-flaps of the foot are equally long; and usually those of the centre toes are much smaller than the side ones, of which the outside one (the great toe) is the broadest. The scrotum, under the anus, is bare.—*Peters, l. c.* p. 277.

I have not seen this skull; but I believe the alteration Dr. Peters made in his second paper is a mistake. The figure of the skull of his *Otaria Philippii* has no resemblance to the skull of my *O. nigrescens*. It is more nearly allied to the skull of *O. Stelleri* from California, agreeing with it in having a vacant space with a pit in the bone between the fourth and fifth upper grinders on each side, looking as if a grinder had fallen out and the cavity had been filled up. The subgenus *Arctophoca* of Dr. Peters's first essay, not as modified in his second one to contain *O. falklandica* (*nigrescens*), chiefly differs from Gill's genus *Eumetopias* (which was formed on my description and figure of the skull of *O. Stelleri* or *californiana*) in the fifth upper grinder not being so far back, but in a line with the back edge of the orbital

process of the zygomatic arch instead of far behind it, as it is in *Eumetopias*.

Dr. Murie, most curiously, considers the skull described by Dr. Peters to be the same as I have described as *O. Hookeri* (P. Z. S. 1869, p. 108).

Dr. Burmeister considered it *O. falklandica* of Shaw; and Mr. Allen (Bull. Mus. Comp. Zool. vol. ii. p. 13) agrees in this opinion; but further on (p. 15) he observes that both Dr. Gray and Dr. Murie have "evidently overlooked the fact that Dr. Peters expressly states that *O. Philippii* has a *thick under-fur*, whereas both the *O. Stelleri* and the *O. Hookeri* are true *hair* Seals." But, in fact, this statement is a mistake as regards me; I never said that *O. Philippii* was the same as *O. Stelleri*, but only that its skull was most nearly allied to it, which I still maintain.

Antarctic Ocean and South Seas.

Otaria jubata. *S. America and islands.*
Phocarctos Hookeri.
Arctocephalus nigrescens.
A. falklandicus.
Arctophoca Philippii. *S. America.*
Arctocephalus antarcticus. *Africa.*
A. nivosus. *Africa.*
A. cinereus. *Australia.*
A. Forsteri. *New Zealand.*
Neophoca lobata. *Australia.*

North Pacific and West Arctic Ocean.

Callorhinus ursinus. *West coast of America.*
Zalophus Gilliespii. *West coast of America and Japan?*
Eumetopias Stelleri. *West coast of America.*

Order CETACEA.

Teeth all similar, conical, sometimes not developed. Palate often furnished with transverse plates of baleen or whalebone. Body fish-shaped, smooth, bald. Limbs clawless; fore limbs fin-shaped; hinder united, forming a forked horizontal fin. Nostrils enlarged into blowers. Teats two, inguinal.—Carnivorous.

They may be divided by the form of the pectoral fin, thus:—

I. *Pectoral fin broad, truncated or rounded at the end; fingers 5, shorter than the arm-bones, subequal, gradually shorter in the series.*—BALÆNIDÆ, CATODONTIDÆ, SUSOIDEA, ORCADÆ, BELUGIDÆ, PONTOPORIADÆ, HYPEROODONTIDÆ, EPIODONTIDÆ, ZIPHIIDÆ.

II. *Pectoral fin elongate, obliquely truncated on the inner side; fingers 5, elongate, longer than the arm-bones, the second and third much longer than the rest.*—INIIDÆ, DELPHINIDÆ, GRAMPIDÆ, GLOBIOCEPHALIDÆ.

III. *Pectoral fin elongate, truncated on the inner side; fingers 4, subequal, more or less elongate.*—AGAPHÆLIDÆ, MEGAPTERIDÆ, PHYSALIDÆ, BALÆNOPTERIDÆ.

By the adhesion or non-adhesion of the cervical vertebræ, thus:—

1. Atlas distinct, the other six cervical vertebræ united by their bodies and spines into a single mass.

Mysticetes.	*Denticetes.*
	CATODONTIDÆ.
	GRAMPIDÆ.

2. Atlas and cervical vertebræ all united into one solid mass.

BALÆNIDÆ.	PHYSETERIDÆ.
BALÆNOPTERIDÆ.	HYPEROODONTIDÆ.
	(?) ZIPHIIDÆ.

3. The atlas, axis, and generally one or two other vertebræ united; the hinder ones sometimes free.

MEGAPTERIDÆ.	EPIODONTIDÆ.
	? ZIPHIIDÆ.
	DELPHINIDÆ.
	GLOBIOCEPHALIDÆ.
	ORCADÆ.

4. Atlas and the other cervical vertebræ entirely free.

PHYSALIDÆ.	PLATANISTIDÆ.
AGAPHELIDÆ.	INIIDÆ.
	PONTOPORIADÆ.
	BELUGIDÆ.

Section I. MYSTICETE (*cf.* p. 57).

Mysticete, *Gray, Cat. Seals & Whales B. M.* pp. 61, 68; *Synops. Whales & Dolph.* p. 1.
Mystacoceti *or* Balænoidea, *Flower, Trans. Zool. Soc.* vi. p. 110.

Head large, depressed. Teeth rudimentary; they never cut the gums. Palate with transverse, fringed, horny plates of baleen. Nostrils separate, longitudinal. Gullet very contracted. Tympanic bones simple, large, cochleate, attached to an expanding periotic bone, which forms part of the skull.

The baleen of the different Whales may be divided by its structure, by its form, and by its colour. The form and structure often go together.

The baleen consists of two parts:—1, the outer layer, called the enamel coat; and, 2, the central fibres, which form the fringe on the inner edge of the blade: both are well seen in cross sections under the microscope. The outer coat or enamel differs in thickness in the different kinds. Thus it is very thick and forms the greater part of the blade in the Greenland Whale; and in different kinds it gradually becomes thinner, until it only forms a thin coat over the central fibres. The central longitudinal fibres differ in thickness and in number. When they are very slender, as in the Greenland Whale, they form only a single layer between the two coats of enamel, and their produced ends make a very fine, long, flaccid fringe to the inner edge of the blade. In other Whales they are very numerous, in many series, and form a considerable part of the thickness of the whalebone, and make a more or less broad and rigid fringe to the blade. In some the fibres are so thick and rigid that they do not droop, but form an erect ragged edge to the short and broad blade, so rigid, indeed, that the fibres of this kind of whalebone are used to make brushes and brooms.

The whalebone varies in form, from being narrow, elongate, many times as long as it is broad at the base, by many gradations, according to the families or genera, until it is not longer than broad. The longest blades have the most enamel and the finest and most flaccid fibres, which, on the other hand, gradually (as it belongs to different genera) become coarser and more rigid as the whalebone diminishes in length compared with its breadth.

The whalebone or baleen offers exceedingly good and permanent characters for the distinction and characters of the species when its structure and form and colour are properly studied. It is stated that sometimes the character of the whalebone is changed by its preparation, as, for example, being soaked in water for some time before it is brought to this country; but the soaking, although it may slightly alter the surface and make the enamel coat rather thinner, does not alter the general form or microscopic structure of the blades.

In my essay on Whales in the 'Zoology of the Erebus & Terror,'

1846, I separated the Right Whales, or Balænidæ, into two divisions—the one having very slender, long, polished whalebone with a single series of fringe, and the second with coarser, shorter, and broader whalebone and a thick coarse fringe. The first was afterwards called *Balæna*, and the second *Eubalæna*. M. Beneden seems inclined to adopt this division (see 'Ostéographie,' Cétacés, p. 144), observing that the former are confined to the Arctic regions and the other to the more temperate zones; but this is not correct, for *Balæna marginata*, as I stated in my first essay, has the whalebone quite as polished and as fine as that of the Greenland Whale. It lives on the west coast of Australia and New Zealand, in company with the Black Whale of Australia and the Black Whale of New Zealand (both of which, I have no doubt, have short coarse whalebone). The Whale of the most northern parts of the Pacific yields the north-west-coast whalebone, which is of a very coarse character.

The first section of Whales, with long, slender, elastic, polished, finely fringed whalebone, contains two genera, *Balæna* and *Neobalæna*.

The Whales of the second section, which have rough, brittle whalebone, with a thick fringe of coarse hairs, includes four genera, viz. *Eubalæna*, *Hunterius*, *Caperea*, and *Macleayius*.

It is very true that I have only seen the whalebone in one of these genera, *Eubalæna*, in connexion with the bones of the animal; but as "the South-sea whalers" (that is to say, those who fish in the Southern and Pacific oceans) have only brought various examples of this kind of whalebone from any of their voyages (except a few blades of the whalebone of *B. marginata*, which they call "sea-tassel"), we may naturally conclude that all the large Right Whales found in those seas have this kind of whalebone.

Suborder I. BALÆNOIDEA (*cf.* p. 46).

Head large. Body stout. Dorsal fin none. Chest and belly smooth, without plaits. Pectoral fin broad, truncated; fingers 5, graduated. Arm-bones very short, thick; radius and humerus of equal length. Baleen elongate, slender. Tympanic bones rhombic. Cervical vertebræ united.

Balænoidea, *Gray, Synops. Whales & Dolph.* p. 1.

Family 1. BALÆNIDÆ. *Right Whales.*

Balænidæ, *Gray, Cat. Seals & Whales B. M.* pp. 61, 75; *Synops. Whales & Dolph.* p. 1; *Lilljeborg, N. Acta Upsal.* 1867, vi.

Head very large, and body short. Dorsal fin none. Belly smooth. Baleen elongate, slender. Vertebræ of the neck anchylosed. Pec-

toral fin broad, truncated at the end; fingers 5. Tympanic bones rhombic; maxillary bones narrow.

Capt. Maury's Whale-Charts show that Right Whales are found in almost all seas, from the poles to within 35 or 30 degrees of latitude on each side of the equator. An experienced whaler observes that "Right Whales are as seldom seen in that belt as Sperm-Whales are found out of it." Capt. Maury justly observes, the torrid zone is to these animals "forbidden ground, and it is as physically impossible for them to cross the equator as it would be to cross a sea of flame. In short, these researches show that there is a belt of from two to three thousand miles in breadth, and reaching from one side of the ocean to the other, in which the Right Whale is never found."—*Maury, Whale-Charts*, p. 233.

Prof. Van Beneden, in a paper to the Royal Belgian Academy, and reproduced enlarged in the 'Ostéographie—Cétacés,' gives a geographical distribution of Whales. He acknowledges only six species, having the following distribution:—

1. *B. mysticetus.* The Arctic Ocean on both sides of Greenland, and on the coast of Siberia to the Sea of Okhotsk.

2. *B. biscayensis.* The North Atlantic, from latitude 65° to 45°, and a belt across the Atlantic to the coast of the United States, from lat. 45° to 50°.

3. *B. japonica.* A band across the North Pacific from lat. 60° to 45° on the west coast of America and 45° to 30° on the coast of Japan.

4. *B. australis.* A belt across the South Atlantic, from lat. 25° to 30° on the south-west coast of Africa and lat. 35° to 50° on the coast of South America.

5. *B. antipodarum.* In a similar belt across the South Pacific from the west coast of South America, in lat. 45°, to New Zealand.

6. A species which he does not name, said to inhabit a belt from Natal to the south-east part of Australia, about lat. 30°.

See Dr. Gray's observations on this theory, Ann. & Mag. Nat. Hist. 1868, vol. i. p. 242, and 1870, vol. vi. p. 193, in which he observes "I think I have proved that M. van Beneden's theory is entirely unsupported by facts."

I. *Baleen thin, polished, with a thick enamel on each side and a fine elongate slender fringe* (cf. p. 42).

1. BALÆNA.

Balæna, *Gray, l. c.* p. 79; *Synops. Whales & Dolph.* p. 1; *Lilljeborg, N. Acta Upsal.* vi. 1867.

First rib slender, narrow, and undivided at the vertebral end. Tympanic bones square; aperture nearly as long as the bone. There is at the end of the radius and at the end of the cubitus a large cartilaginous compartment which corresponds with the radial and cubital bone, and has not even a bony nucleus; between these two cartilages is an intermediate cartilage; below these are two or three

carpals. Cervical vertebræ united by their bodies. Upper lateral process of atlas broad at the base, compressed, rather narrow, and rounded at the end; the lower lateral process elongate, subcylindrical, angulated at the lower side of the base (see Cat. Whales, p. 84, f. 4; Ostéogr. Cét. t. 4. f. 5–9). The lower process of the second and third elongate and produced; the upper process of the second, fifth, sixth, and seventh elongate, produced, and bent forward. Bladebone with a large, compressed, elongate acromion (Ostéogr. Cét. t. 4. f. 26). Carpus cartilaginous, with three small carpal bones (Ostéogr. Cét. t. 4. f. 27).

1. Balæna mysticetus. B.M.

Balæna mysticetus, *Gray, l. c.* pp. 81, 370, figs. 1, 2, 4, 5; *Synops. Whales & Dolph.* p. 1, t. 1. f. 4 (baleen); *R. Brown, P. Z. S.* 1868, p. 534.

Inhab. North Sea.

Dr. Robert Brown gives an account and notes of the habits and migrations of this animal. He observes:—"Where the Whale goes to in winter is still unknown. It is said that it leaves Davis Strait about the month of November, and produces young in the St. Lawrence River, between Quebec and Camaroa, returning to Davis Strait in the spring. At all events, early in the year they are found on the coast of Labrador, where the English whalers occasionally attack them; but the ships arrive generally too late, and the weather at that season is too tempestuous to render the 'south-west fishing' very attractive. . . . It is said that early in September they enter Cumberland (Hogarth's) Sound in great numbers, and remain until it is completely frozen up, which, according to the Eskimo account, is not until January. . . . They enter the Sound again in the spring, and remain until the heat of summer has melted off the land-floes in these comparatively southern latitudes. It thus appears that they winter and produce their young all along the broken water off the southern coasts of Hudson's Strait, Davis Strait, and Labrador."

He continues, "I am strongly of belief that the Whales of the Spitzbergen sea never, as a body, visit Davis Strait, but winter somewhere in the open water at the southern edge of the northern ice-fields. The Whales are being gradually driven further north."

2. Balæna mediterranea.

Balæna mediterranea, *Gray, Ann. & Mag. Nat. Hist.* 1870, vi. pp. 198, 200.

Baleine, *Lacépède, Cétacés*, tab. 7. fig. 1.

Balæna biscayensis (part.), *Van Beneden, Ostéogr. Cét.* tab. 7. fig. 1 (animal), figs. 8–11 (nuchal vertebræ), figs. 2, 3 (? vertebræ).

Inhab. Mediterranean, I. St. Marguerite (*Lacépède*).

3. Balæna angulata. B.M.

Balæna mysticetus, var. angulata, *Gray, Cat. Seals & Whales*, p. 86, f. 5 (ear-bones).

Inhab. North Sea? Ear-bones, British Museum.

4. Balæna nordcaper.

Balæna nordcaper, *Bonnat.*
Balæna islandica, *Brisson.*
Balæna biscayensis, *Eschricht.*
Balæna mysticetus, var., *Brown, P. Z. S.* 1868, p. 546.

Inhab. Iceland. Called "Slet-bag."

It has been ascertained, "1st, that it is much more active than the Greenland Whale, much quicker and more violent in its movements, and accordingly both more difficult and dangerous to capture; 2nd, that it is smaller (it being, however, impossible to give an exact statement of its length) and has much less blubber; 3rd, that its head is shorter, and that its whalebone is comparatively small and scarcely more than half the length of that of the *B. mysticetus*; 4th, that it is regularly infested with a cirriped belonging to the genus *Coronula*, and that it belongs to the temperate North Atlantic as exclusively as the *B. mysticetus* belongs to the icy sea."—*Dr. Brown, P. Z. S.* 1868, p. 546.

Dr. Brown says that barnacles are looked upon as a sign of age in a Whale; and he considers that a considerable portion of the description of the *nordcaper* corresponds with what he has said of the Spitzbergen whale (P. Z. S. 1868, p. 547).

See also:—

1. Balæna mysticetus, *Cope, Proc. Acad. N. S. Philad.* 1869, pp. 17 & 35.
   The Bow-headed Whale, Scammond, *American whalers.*
   Inhab. Behring's Straits.

2. Balæna kuliomoch, *Chamisso, Nov. Acta Natur.* tab. 7. fig. 1; *Gray, Ann. & Mag. N. H.* 1870, vi. p. 202.
   Balæna cullamacha, *Chamisso, Nov. Act.* xii. p. 251, t. ; *Cope, Proc. Acad. Phil.* 1868, p. 225, 1869, pp. 14, 17, & 40, fig. 4.
   Inhab. North Pacific.
   From wooden model made by the Aleutians.

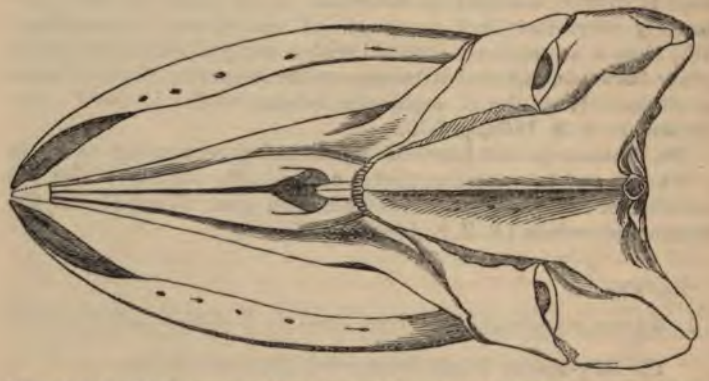
2. NEOBALÆNA.

Skull rather depressed; brain-cavity nearly as long as the beak, depressed, much expanded on the sides, with a very deep notch on the middle of each side over the condyles of the lower jaw, and with a subtriangular crown-plate. The nose as broad as the expanded brain-cavity at the base, regularly attenuated to a fine point in front, and slightly arched downwards. Lower jaw laminar, compressed,

high; the upper edge thin, and inflexed the greater part of its length, erect in front; the lower edge inflexed in front, the rest of

Fig. 1.

Fig. 2.



Figs. 1 & 2. Side view and top view of the skull of *Neobalæna marginata*, from Dr. Hector's figures.

the edge being simple. The baleen elongate, slender, several times as long as broad, with a fringe of a single series of fine fibres; enamelled surface smooth and polished, thick.

1. Neobalæna marginata. B.M.

Balæna marginata, *Gray, Cat. Seals & Whales Brit. Mus.* p. 90; *Hector, Proc. & Trans. of the New-Zealand Institute*, 1869, t. 2 B. f. 1–4; *Ann. & Mag. Nat. Hist.* 1870, v. p. 221, and vi. p. 155, figs. 1 & 2.

Inhab. New Zealand; Island of Kawau (*Sir G. Grey*). Mus. Wellington.

In width and general form the beak of the skull is somewhat like the beak of some of the Finner Whales; but it does not at all justify Mr. Knox's idea that *Balæna marginata* is a Finner. But this difference of skull makes us more anxious to have the descrip-

tion of the entire animal and its skeleton, as the animal may prove to be the type of a new family of Whales, between the true Whales and Finners.

This pigmy whale, which is not more than 15 or 16 feet long, is a representative in the Southern Ocean of the gigantic Right Whale of the Greenland seas. It has the most beautiful, the most flexible, most elastic, and the toughest whalebone or baleen yet discovered; and if this were of larger size, it would fetch a much higher price than the whalebone of the Greenland Whale, the latter being three or four times the value of the brittle coarse whalebone of the *Eubalænæ* or Right Whales of the Southern and Pacific Oceans. The trade of the Continental nations being chiefly confined to their colonies, or their merchants obtaining the whalebone that is used in their manufactures second-hand, there are not in the market the varieties of whalebone and finner-bone which we have in this country, where the whalebone and finner-bone from different localities bear each a different value. This perhaps explains why the Continental zoologists (as Eschricht) who have paid attention to the structure of whales have not paid sufficient attention to the characters afforded by the shape, structure, and colour of this substance, to which I called their attention more than twenty years ago, and showed its value as a character for distinguishing the genera and species. It has been a fertile subject of reproach to me that I established some species on the characters afforded by this substance; but I need only mention, as a proof of the little attention Van Beneden has paid to this part of my work, that in his book on the anatomy of Whales, now in progress, after saying that I have established the species *Balæna marginata* on three blades of whalebone, he says I have called it *Eubalæna marginata*, thus confounding it with the Whales with brittle and coarse whalebone—whereas the chief reason that induced me to consider the blades to belong to a distinct species was their very fine and tough structure. The accuracy of the determination is now proved by the very different form of its skull from that of any other known Whale. In the same manner, the *Physalus antarcticus*, also established on finner-bone or baleen imported from New Zealand, has been proved to be a very distinct species of that genus, named Sulphur-bottoms by the whalers.

From the description given at page 90 of the British-Museum 'Catalogue of Seals and Whales,' there is no doubt that the baleen corresponds with the above species. The specimen was obtained at Kawau Island by Sir George Grey, and appears to be unique, as the species has hitherto only been known from the baleen.

The dimensions are as follows:—

	lbs.
Weight of cranium	58
Weight of lower jaw	13

	ft.	in.
Length	4	9
Fronto-nasal section	2	10

	ft.	in.
To centre of orbit	3	10
Width at orbit	2	5
Width at mastoid process	2	7

	in.	lin.
Lower jaw, high	3	11
Depth (greatest)	8	0

Baleen 29 inches long, $3\frac{1}{2}$ inches in extreme width.
Black margin from $\frac{1}{4}$ to $\frac{3}{8}$ inch.

"Knox now admits that this is not the Sulphur-botttom, which he says is the Trigger of the New-Zealand whalers. He fancies that *B. marginata* may be the true Finner of the south. I will try to find some more of the bones."—*Trans. New Zeal. Inst.* 1870, p. 26.

This Whale, from the form and structure of the whalebone, cannot be a Finner, but is certainly, as I arranged it, a true Right Whale, very nearly allied to the Right Whale of Greenland, and of a very small size. The bones of this Whale would be a most valuable addition to the British Museum or any zoological museum. They appear not to be uncommon in the Kawau Islands; and the measurements of the skull are a valuable addition to our knowledge of the species.

This small Right Whale of the Antarctic Sea is the representative of the Right Whale in the Arctic Sea, and, judging from the length of the head, cannot be more than 14 or 15 feet long, while the Greenland Whale is from 50 to 65 feet long.

II. *Baleen thick, not polished, with a thin enamel coat on each side, and a coarse thick fringe* (cf. p. 37).

3. EUBALÆNA.

Eubalæna, *Gray, l. c.* p. 91; *Synops. Whales & Dolph.* p. 1; *Lilljeborg, N. Acta Upsal.* vi. 1867; *Flower, Trans. Zool. Soc.* vi. p. 115.

First rib broad at the vertebral end. Tympanic bone square; aperture nearly as long as the bone. The first six cervical vertebræ all united by their bodies. The upper lateral process of the atlas subcylindrical, narrow at the base, recurved and rounded at the end; the lower lateral process narrow at the base, swollen and rounded at the end (Ostéog. Cét. t. 1. f. 19). Carpus cartilaginous, with six carpal bones, a radius and cubitus, one radial and one cubital and two carpals in the second range (Ostéog. Cét. t. 1. f. 1). Scapula as long as broad, with a small cylindrical coracoid process, rounded at the end. Five phalanges to the middle finger, four to the index and ring fingers, four to the little finger, and two to the thumb. The first rib is simple at the upper and thin at the free edge. The nasal bone rhomboidal, moderate. Vertebræ 50–59.

1. Eubalæna australis. B.M.

Eubalæna australis, *Gray, l. c.* p. 91, fig. 6; *Synops. Whales & Dolph.* p. 1.
Balæna australis, *Cuv. Oss. Foss.* v. t. 25–27.
Balæna capensis, *Gray, Synops. Whales & Dolph.* t. 1. f. 3 (baleen).

Inhab. Cape of Good Hope.

2. Eubalæna Sieboldii.

Eubalæna Sieboldii, *Gray, l. c.* p. 96; *Synops. Whales & Dolph.* p. 1, t. 1. f. 2 (baleen).
Balæna japonica, *Gray, Zool. Ereb. & Ter.* p. 15, tab. 1*. fig. 2 (baleen).
Balæna alutiensis, *Meyer*; *Van Beneden, Bull. Acad. Belgique*, xx. 1866, no. 14. [Both from the North-west-Coast whalebone of commerce, which is quite distinct from the South-sea whalebone, brought from the Cape.]
Balæna japonica, *Eschricht, Vid. Selsk. Skrivt.* ser. 5. ix. p. 1, Kjöbenh. 1869, pl. 1 (skull of fœtus), pl. 2 (head); *Gray, Ann. & Mag. Nat. Hist.* 1870, vi. p. 202.

Inhab. Kamtschatka. Skeleton of fœtus $5\frac{1}{4}$ feet long, in Mus. Copenhagen.

See also the following doubtful species:—

1. Balæna japonica, *Lacépède, Mém. Mus.* iv. p. 473.
Balæna lunulata, *Lacép. Mém. Mus.* iv. p. 475.

These two are from Chinese, or, rather, Japanese drawings.

2. Balæna australis, *Temminck, Fauna Japonica*, Taf. 28 & 29 (not *Desmoulins*).
Balæna Sieboldii, *Gray, Ann. & Mag. N. H.* 1864, xiv. p. 349.

From a model made by the Japanese in porcelain clay.

3. Eubalæna? cisarctica.

Eubalæna? cisarctica, *Cope.*
Balæna cisarctica, *Cope, Proc. Acad. Nat. Sc. Philad.* 1865, p. 1; *Gray, Ann. & Mag. N. H.* 1868, i. pp. 244 & 247, 1870, vi. p. 200.
Balæna biscayensis, *Van Beneden, Ostéogr. Cét.* t. 7. figs. 4, 5, 6 (earbones only).

Inhab. Atlantic.

"There is a skeleton of the *Balæna cisarctica* in the Museum of the Academy of an individual of 37 feet, and a ramus mandibuli 16 feet in length, indicating a total of 68 feet, adult size. A scapula in the Museum, Rutger's College, New Brunswick, N. J., measures 36 inches in height, and 48·5 inches in width, indicating an adult of 57 feet in length. A young individual of 45 feet, line-measurement, awaits mounting in the Museum Compar. Zoology, Cambridge, Mass. Of this individual I will shortly give a detailed description in an essay on the species. Like the other specimens,

it presents a strong acromion. The phalanges of the manus exhibited an important difference from those of *B. australis*. In it they number respectively 2, 5, 6, 3, 3, while Cuvier gives (Oss. Foss. 227. 23) 2, 5, 6, 5, 4."

4. HUNTERIUS.

Hunterius, *Gray, l. c.* pp. 78, 98; *Synops. Whales & Dolph.* p. 1; *Lilljeborg, N. Acta Upsal.* vi. 1867.

First rib broad, with a double head at the vertebral end. Tympanic bones square; aperture nearly as long as the bone. Vertebræ 57 or 58; the five first cervical united. Five phalanges in the fourth or ring finger, and four to the second, third, and fifth fingers. The first rib bifid and articulated to the first two dorsals, or the last cervical and the first dorsal; the second rib very thick at the free end. The nasal bones very large.

1. Hunterius Temminckii.

Hunterius Temminckii, *Gray, l. c.* p. 98, fig. 8; *Synops. Whales & Dolph.* p. 1; *Ann. & Mag. N. H.* 1870, p. 191.
Balæna australis, *Temm. F. Japon.* t. 28, 29.
Balæna australis, var., *Van Ben. Ostéogr. Cét.* p. 35.

Inhab. Cape of Good Hope.

M. van Beneden regards the character on which this genus is established as merely a variation of *Balæna australis* (Ostéog. Cét. p. 35).

The skeleton was sent from the Cape of Good Hope by Dr. Horstock. It is described by Schlegel, Abhand. Gebiete der Zool. 1841, p. 37 (Flower, P. Z. S. 1864).

2. Hunterius biscayensis.

Hunterius biscayensis, *Gray, Ann. & Mag. Nat. Hist.* 1868, i. p. 244; *Synops. Whales & Dolph.* p. 2.
Balæna biscayensis, *Eschricht, Compt. Rendus*, 1860, *Act. Soc. Linn. Bordeaux*, xiii.; *Gray, Ann. & Mag. N. H.* 1870, p. 200 (not *Van Beneden*).
Balæna eubalæna, *Flower, P. Z. S.* 1864, p. 391.

Inhab. St. Sebastian. Skeleton of very young animal in Mus. Copenhagen, from the Museum of Pampeluna.

Mr. Flower informs me that this skeleton belongs to the genus *Hunterius*, which has brittle whalebone, with a large coarse fringe (which easily splits into strips), and a bifid first rib.

3. Hunterius Swedenborgii.

Hunterius Swedenborgii, *Lilljeborg, N. Act. A. Sci. Upsal.* vi. 1867, p. 35, t. 9, 10, 11 (skeleton); *Gray, Synops. Whales & Dolph.* p. 1.

Inhab. North Sea; Sweden (subfossil).

5. CAPEREA.

Caperea, *Gray, l. c.* pp. 78, 101; *Synops. Whales & Dolph.* p. 2; *Lilljeborg, N. Acta Upsal.* vi. 1867.

First rib ——? Baleen ——? Tympanic bones irregular, rhombic; aperture irregular, much contracted at the upper end; the wide part not half the length of the bone. "Cervical vertebræ all united. First rib single at the upper, and very broad at the lower end. Bladebone (acromion) rudimentary. Coracoid process none."—*Lilljeborg.*

Vertebræ 55; the seven cervical all soldered by their bodies, and the spinous processes of the first five united into a single crest, and of the two last into a separate crest; each has a distinct upper lateral process and, except the seventh, a distinct lateral process. Upper lateral process of the atlas narrow, square, reflexed, and bent upwards; lower one thick, enlarged, and rounded at the end (Ostéogr. Cét. t. 3. f. 4, 5). Scapula with only a slight ridge in the place of the acromion (Ostéogr. Cét. t. 3. f. 7). Carpus cartilaginous, with five small bones. Skull with a slender arched beak. Lower jaw subcylindrical, thick near the condyle, rather attenuated in front.

The first rib is very narrow above, and gradually becomes very broad below and deeply notched on the lower edge, which embraces nearly the whole length of the sternum; upper end with a single head. Second rib equally large at the free end, and not notched. Phalanges 1, 4, 5, 4, 3.

I believe that the "*bonnet*" of the Sandwich-Islands whalers is only the "*topknot*" of the old male whale of this genus, or of a nearly allied species.

1. Caperea antipodarum. B.M.

Caperea antipodarum, *Gray, l. c.* p. 101, f. 9; *Synops. Whales & Dolph.* p. 2.

Balæna australis, *Desm. Diction.*

Balæna antipodarum, *Van Ben. Ostéogr. Cét.* p. 46, t. 3; *Gray, Dieffenbach*, t. 1.

Inhab. New Zealand. Skeleton, Mus. Paris.

The seven cervical vertebræ are completely soldered by their bodies; and the first five spinal apophyses form a continuous crest, and the two last form a separate crest (Ostéogr. Cét. t. 3. f. 4, 5). The petrous portion of the skull short, small. The bladebone longer than broad, with only a slight indication of a process on the front edge. Upper lateral process of the axis square, bent back; lower process rounded at the end and prominent.

6. MACLEAYIUS.

Macleayius, *Gray, l. c.* pp. 103, 371; *Synops. Whales & Dolph.* p. 2.

Cervical vertebræ united into a single mass; upper lateral process of the atlas very broad, compressed, occupying the greater part of the side, truncated at the end. Lower margin close on the lower

lateral process. Lower lateral process elongate, compressed, rather swollen in the middle, truncated at the end and bent forward, the upper processes of the second and third cervical vertebræ forming a crest (Cat. Seals & Whales, p. 105, f. 10, 11, and p. 372, f. 74, 75). Baleen —— ?

1. Macleayius australiensis.

Macleayius australiensis, *Gray*, *l. c.* pp. 105 (figs. 10, 11), 371 (figs. 74, 75); *Synops. Whales & Dolph.* p. 2.

Inhab. Australian seas.

Atlas vertebra—the width, measuring from the extremity of the lower processes, 28½ inches; width of the atlas 25 inches; height from the base of atlas to top of crest 18 inches. Thickness of last cervical vertebra 10 inches.

2. Macleayius britannicus. B.M.

Macleayius britannicus, *Gray*, *Ann. & Mag. N. H.* 1870, vi. pp. 198 & 204.

Balæna biscayensis, *Van Beneden* (part.), *Ostéogr. Cét.* tab. 7. fig. 7 (copied from *Gray*, *Cat. Seals & Whales*, p. 83, fig. 3).

Balæna britannica, *Gray*, *Ann. & Mag. N. H.* 1870, vi. p. 200.

Inhab. Lyme Regis, Dorsetshire.

Cervical vertebræ of *Balæna* from Lyme Regis (Gray, Cat. Seals & Whales, p. 83, f. 3) copied on plate of *Balæna biscayensis*, Ostéog. Cét. t. 7. f. 7. Dredged up at Lyme Regis. The lateral processes of this bone are much more like those of *Macleayius australiensis* than those of any other species; yet it differs in the outer edge of the broad lateral process being oblique, narrowed towards the base, and in the lower lateral process being shorter, turned up at the end, and the outer end obliquely truncated and subangular below. This massive vertebra has no affinity with *B. biscayensis*, and indicates the existence of a completely different new species of Right Whales, which appears to be an inhabitant of our seas.

Suborder II. BALÆNOPTEROIDEA (*cf.* p. 36).

Balænopteridæ, *Gray*, *l. c.* pp. 61, 106.

Balænopteroidea, *Gray*, *Synops. Whales & Dolph.* p. 2.

Head moderate. Body elongate. Dorsal fin distinct, rarely wanting. Belly longitudinally plaited, rarely smooth. Baleen short, broad. Maxillary bones broad. Pectoral fin lanceolate; arms elongate; radius and ulna much longer than the humerus. Fingers 4, subequal. Vertebræ of the neck free, or partially united. Tympanic bones oblong or ovate.

Family 2. AGAPHELIDÆ. *Scrag Whales.*

Head moderate; body elongate; hinder part of the back keeled and notched. Cervical vertebræ free. Pectoral fin lanceolate. Fingers 4. Throat without plaits. No dorsal fin. Ribs single-headed.

Mr. Cope "mentioned that he had an opportunity of examining a portion of a specimen of the Scrag Whale of Dudley, *Balæna gibbosa* of Erxleben, and ascertained that it represented a genus not previously known. It was a Fin-back Whale; but without dorsal fin or throat-folds, resembling superficially the genus *Balæna*. The *baleen short and curved*. The genus was called *Agaphelus*."

1. AGAPHELUS.

Cervical vertebræ free. Fingers 4. Throat without plaits. No dorsal fin. Ribs single-headed. Scapula with acromion (Cope, Proc. Soc. N. Sc. Phil. 1869, p. 16).

Agaphelus, *Cope, Proc. Soc. N. Sc. Phil.* 1868, pp. 159, 225; *Gray, Ann. & Mag. N. H.* 1870, vi. p. 200.

"Fingers four, elongate. Cervical vertebræ ——? Lumbar and anterior caudal vertebræ longer than their greatest diameter. Dorsal fin wanting. Gular and pectoral region without folds. Scapula with well-developed acromion and coracoid. Baleen narrow, short, curved.

"The baleen is peculiar; throughout the length of the maxillary bone it nowhere exceeded one foot in length, and the width of the band, or length of the base of each plate, four inches. It is of a creamy white; the fringe very coarse, white, and resembling hogs' bristles.

"The ear-bone is much compressed, with an inferior carina, towards which the lip of dense bone is suddenly decurved. The longitudinal opening is much contracted, especially anteriorly, where the bone is pinched up into a keel; and there is no abrupt concavity of the inner lip at that point. External surface not very rugose. Total length 3 in. 2·5 lines.

"The scapula preserved is low and elongate, with well-developed acromion and coracoid process. It is evidently of the type of *Balænoptera* and *Physalus*; the ulna and radius relatively less elongate than in *Sibbaldius laticeps* and *borealis*, being 1·5 as long as the humerus, thus resembling *Physalus*.

"The four fingers, with the second much the longest, form a fin of the type of those genera.

"The ear-bone is much more compressed than in *Physalus antiquorum* or *Sibbaldius laticeps*.

"The mandibular ramus is rather massive, moderately curved, and with a more elevated coronoid process than in any Whale that I have seen.

"The greatest peculiarity is in the form of the lumbar and

anterior caudal vertebræ; they are of a much more elongate form than any I have seen or found figured, excepting those of the *Balænoptera rostrata* (as figured by Gaimard in 'Voyage de la Recherche'), which, however, are relatively shorter. Those of the present species are of greater length than transverse diameter, the lumbars most elongate; all furnished with an acute hypapophysial keel and concave sides, and entirely transverse diapophyses. This peculiarity is consistent with the account of my informant, who stated the animal to have been of an unusually elongate and slender form. When it came ashore it had perhaps been dead ten days; the flukes and muscular region as far as the third caudal vertebra had been devoured, probably by Sharks and Killers, and the abdominal region much lacerated; the edge of a fin preserved was slit by the teeth of some carnivorous enemy. The measurement from the end of the muzzle to the end of the third caudal was 35 feet, which may be reduced to 33 feet axial. Up to this point the dorsal line was, according to my informant, entirely smooth, without knob or fin, or scar of one; hence I suppose the fin (if present) to have been situated, as in *Sibbaldius* &c., at the posterior fourth of the length, and not, as in *Balænoptera*, on the posterior third. It may then be safely assumed, bearing in mind the form of vertebræ, that ten feet of the whale's length had been removed, making in all 43 feet. That the species attains over 50 feet is probable, as the present individual was quite young, the epiphyses separating from the vertebræ with the greatest ease. The slender form of the animal is corroborated by the slenderness and slight curvature of the ribs, one attached beneath the scapula, probably the second, being narrower than the corresponding ones in *Sibbaldius*. I therefore think it most probable that in this form the anterior ribs are single-headed."—*Cope, l. c.* p. 223.

1. **Agaphelus gibbosus.** *The Scrag Whale.*

Agaphelus gibbosus, *Cope.*
Balæna gibbosa, *Gray, Cat. Seals & Whales*, p. 90.
Scrag Whale, *Dudley, Phil. Trans.* xxxiii. p. 259.

Inhab. North Atlantic.

2. RHACHIANECTES.

Rhachianectes, *Cope, Proc. Acad. N. Sc. Philad.* 1869, pp. 14 & 15.

Cervical vertebræ free. Throat without plaits. Dorsal fin none. Scapula without acromion.

1. **Rhachianectes glaucus.** *The Californian Grey Whale.*

Rhachianectes glaucus, *Cope, Proc. Acad. N. Sc. Philad.* 1869, pp. 17 & 40, fig. 8.
Agaphelus glaucus, *Cope, ibid.* 1868, p. 225.

Inhab. California, San Francisco.

"The points in which this species differs from those of the genus *Balæna* previously known are numerous, and will no doubt be increased on a further knowledge of the animal.

"The head, between one-fourth and one-fifth of the total length, allies it to the shorter-headed species. From the *B. australis* the number of dorsal vertebræ, and the colour and shortness of the baleen, distinguish it; and no doubt other features will be brought out when we are acquainted with the Cape species. The dorsal serration is not known to occur in any species of the genus *Balæna*, though said to be characteristic of the *A. gibbosus*, whose characters I have just given.

"Two *Balænæ* have been described as inhabiting the North Pacific Ocean, *Balæna Sieboldii*, Gray (Catal. Cet. 1865, p. 96), and *Balæna cullamach*, Chamisso (Nov. Act. Acad. Cæs. xii. p. 251, tab.)

"Both have been established on figures carved by the natives, of the Japanese and Aleutian Islands respectively, the former under the supervision of a naturalist, the traveller Siebold. The carving of the *B. cullamach*, judging from the figure given by Chamisso, can but doubtfully represent any species; but if the species exist, it will rest on the following diagnosis of its describer:—'Rictu amplo forma litteræ S curvato, elasmiis maximis atro-cæruleis, spiraculis flexuosis, in medio capite, tuberculo in apice rostri (ex imagine), pectore pinnisque pectoralibus albis, dorso gibboso sexpinnato.'

"These are, however, true *Balænæ*. A species of *Agaphelus* exists in the Kamtschatkan seas, according to Pallas, who, however, derives his information solely from wooden models made by the Aleutian Islanders. This is not sufficient basis for an introduction to the scientific system; yet Pallas indulges in applying to it the name *Balæna agamachschik*. The pectoral limb of this species is said, however, to be white, with the underside of the flukes, characters not found in the *A. glaucus*. Dr. Gray has already (Cat. Brit. Mus.) indicated that this, if reliable, indicates a genus unknown to him.

"The *Agaphelus glaucus* is the Grey Whale of the coasts of California. Two specimens have been examined by my friend Wm. H. Dall, of the scientific staff of the U. S. Russian-American Telegraph Expedition, one of them near Monterey; and descriptions, as complete as the state of the specimens would allow, were made.

"These, which were sent to the Smithsonian Institution, and placed in my hands by Prof. Baird, are quite sufficient to indicate a Whale of a species hitherto unnoticed, and to render certain its future identification.

"Dorsal vertebræ and ribs 13; lumbar and caudal (those in the fluke cut off with it) 28. Scapula, breadth and height not very different, with a short broad coracoid process; its head opposite first rib. Apparently only four fingers, of which the second is the longest. 145 laminæ of baleen on each side, the longest 18 inches long; colour bright yellow."—*Cope, Proc. Ac. N. Sc. Philad.* 1868, p. 226.

Family 3. MEGAPTERIDÆ. *Humpbacked Whales.*

Megapterina, *Gray, l. c.* p. 113.
Megapteridæ, *Gray, Synops. Whales & Dolph.* p. 2.

Dorsal fin low, broad; pectoral fin very long, with four very long fingers of many phalanges. Vertebræ 50 or 60; cervical vertebræ often anchylosed. Lateral process of the axis tardily ossified. Neural canal large, high, triangular. Ribs 14 or 15.

1. MEGAPTERA.

Megaptera, *Gray, l. c.* pp. 113, 117; *Synops. Whales & Dolph.* p. 2; *Lilljeborg, N. Acta Upsal.* 1867, vi.

Bladebone without acromion or coracoid process. Body of cervical vertebræ subcircular.

1. Megaptera longimana. B.M.

Megaptera longimana, *Gray, l. c.* pp. 119 (fig.), 373; *Synops. Whales & Dolph.* p. 2.
Megaptera boops, *Gray, Synops. Whales & Dolph.* tab. 30 (baleen and jaws with rudimentary teeth), t. 33. f. 12 (vertebra).

Inhab. North Sea.

2. Megaptera Novæ-Zelandiæ. B.M.

Megaptera Novæ-Zelandiæ, *Gray, l. c.* p. 128, fig. 20; *Synops. Whales & Dolph.* p. 2.

Inhab. New Zealand. Ear-bones in Brit. Mus.

3. Megaptera ? Burmeisteri.

Megaptera ? Burmeisteri, *Gray, Cat. Seals & Whales*, p. 129.
Megaptera Lalandii (part.), *Van Beneden, Ostéogr. Cét.*

Inhab. Buenos Ayres. Skeleton, Mus. Buenos Ayres.

4. Megaptera americana.

Megaptera americana, *Gray, Cat. Seals & Whales*, p. 129.

Inhab. Bermuda.

"The *norwega* is a Humpback which has the belly white and smooth (?), back very dark bluish, length 50 to 55 feet. This whale gives more oil than the *mystica*."—*Hartt, Geology & Physical Geography of Brazil*, p. 182.

"The whalebone is short, and sells well. The beach on which the whales are cut up is strewed during the season with bones. There must be the bones of 500 whales on the spot. The fishery is carried on at Bahia on a much larger scale than at Caravellas."—*L. c.* p. 185.

5. Megaptera kuzira.

Megaptera kuzira, *Gray, Cat. Seals & Whales*, p. 130.

Inhab. Japan. Skull, Mus. Leyden.

6. Megaptera osphyia.

Megaptera osphyia, *Cope, Proc. Acad. Nat. Sci. Philad.* 1865, p. 4.

Inhab. Atlantic. Skeleton, Mus. Niagara.

"A second and more full examination of the *Megaptera osphyia*, Cope, furnishes the following additional points and characters. The specimen is young, and measures in its present condition 34 feet. It has, however, lost a considerable number of caudal vertebræ, and, from the posterior part of the column, of intervertebral cartilages also; add to this the shrinking of the cartilages preserved, and the increase of length would perhaps amount to 8 feet, giving 42 in all. The asserted length of 50 feet, line measurement, which I quoted in my original description, is no doubt an exaggeration.

"The glenoid process is margined by an angular prominence, the rudiment of the coracoid, precisely as in the *M. brasiliensis*. The diapophysis of the atlas is a flat vertical plate, extending from opposite the base of the *foramen dentatum* to opposite the widest point of the spinal canal; inferior posterior outline of the atlas broad, slightly concave mesially. The mandible is peculiar in the strong angular process, which extends from behind, round the side, projecting as far as the condyle, and separated from it by a deep groove. The third and fourth cervicals are united by the neural arch. The first rib is very broad at the extremity; length 37 inches, width at end 8·22 inches. The orbital processes of the frontal bone are not contracted at the extremities as in *M. longimana*, but are more as in *Balænopteræ*; entire width over and within edge of orbit 15½ in.; length to vertical plate of maxillary 31 inches. The baleen measures 2 feet in length, is black, with three rows of coarse bristles. Its base is one curve; its length is spirally twisted. The species is probably one of the largest of the *Balænidæ*."—*Cope, Proc. Acad. Nat. Sci. Philad.* 1868, p. 194.

7. Megaptera versabilis.

Megaptera versabilis, *Cope, Pr. Acad. Nat. Sci. Phil.* 1869, p. 17, figs. 5 & 6.

Inhab. North Pacific, Californian coast.

2. POESCOPIA.

Poescopia, *Gray, l. c.* p. 113; *Synops. Whales & Dolph.* p. 2.

Bladebone with small coracoid process. Body of cervical vertebræ nearly square.

1. Poescopia Lalandii. B.M.

Poescopia Lalandii, *Gray, l. c.* pp. 126 (fig. 19, p. 125), 373; *Synops. Whales & Dolph.* p. 2, tab. 33. f. 3, 4 (vertebræ, from *Cuvier*).

Inhab. Cape of Good Hope. Skeleton, Mus. Paris.

3. ESCHRICHTIUS.

Eschrichtius, *Gray, l. c.* pp. 113, 131; *Synops. Whales & Dolph.* p. 2; *Lilljeborg, N. Acta Upsal.* vi. p. 12, 1867.

Bladebone with large coracoid process. Body of cervical vertebræ separate, small, roundish-oblong. The neural canal very broad and high.

1. Eschrichtius robustus. B.M.

Eschrichtius robustus, *Gray, l. c.* pp. 133 (fig.), 373; *Synops. Whales & Dolph.* p. 2; *Lilljeborg, N. Acta Upsal.* 1867, vi. p. 16, t. 1–8; *Cope, Proc. Acad. Nat. Sci. Philad.* 1865, p. 4.

Inhab. North Sea; coast of Devonshire, Sweden; Atlantic.

"The *Eschrichtius robustus* is admitted on the evidence of a ramus of the under jaw in the Museum, Rutger's College, which is of peculiar form, and closely resembles the figure given by Lilljeborg of that portion of this rare species."—*Cope, Proc. Acad. Nat. Sc. Philad.* 1868, p. 194.

Family 4. PHYSALIDÆ. *Finner Whales.*

Physalina, *Gray, l. c.* pp. 114, 134.
Physalinidæ, *Gray, Synops. Whales & Dolph.* p. 2.

Dorsal fin high, erect, compressed, falcate, about three-fourths the entire length from the nose. Pectoral fin moderate, with four short fingers of four or six phalanges. Vertebræ 55 or 64. Cervical vertebræ not anchylosed. Neural canal oblong, transverse.

* *Vertebræ* 60 *or* 64; *first rib single-headed* (cf. p. 54).

1. BENEDENIA.

Benedenia, *Gray, l. c.* pp. 114, 135; *Synops. Whales & Dolph.* p. 2.

Rostrum of skull narrow, attenuated, with straight slanting edges. Second cervical vertebra with two short truncated lateral processes. The first rib single-headed.

1. Benedenia Knoxii. B.M.

Benedenia Knoxii, *Gray, l. c.* pp. 138, figs. 24–26; *Synops. Whales & Dolph.* p. 2.
Benedenia boops, *Gray, Synops. Whales & Dolph.* tab. 32. f. 1, 2 (cervical vertebræ).

Inhab. North Sea, coast of Wales.

2. PHYSALUS.

Physalus, *Gray, l. c.* pp. 114, 139; *Synops. Whales & Dolph.* p. 2; *Lilljeborg, N. Acta Upsal.* 1867, p. 72.

Rostrum of the skull narrow, attenuated, with straight sloping sides. Second cervical vertebra with a broad lateral process, with a large perforation at the base. First rib single-headed. Sternum

trifoliate, with a long slender hind process. Fingers shorter than the forearm-bones. Scapula very broad; acromion and coracoid process well developed.

† *Lateral rings of the second cervical vertebra as long as the diameter of the body of the vertebra.*—Gray, *l. c.* p. 374; Synops. Whales & Dolph. p. 2.

1. Physalus antiquorum. B.M.

Ribs 14 . 14.

Physalus antiquorum, *Gray, l. c.* pp. 144 (figs. 29–32), 374; *Synops. Whales & Dolph.* p. 2, t. 1. f. 6 (baleen), t. 32. f. 5, 6 (cervical vertebræ); *Flower, P. Z. S.* 1869, p. 604, pl. 47 (male).
Balænoptera musculus, *Van Beneden, Ostéogr. Cét.* t. 12 & t. 13. figs. 11–24.

Inhab. North Sea, Greenland, Hampshire, &c.

2. Physalus Duguidii.

Ribs 15 . 15.

Physalus Duguidii, *Gray, l. c.* p. 158, figs. 33–35; *Synops. Whales & Dolph.* p. 2.

Inhab. North Sea, Orkneys.

†† *The lateral rings of the cervical vertebræ shorter than the diameter of the bodies of the vertebræ.*—Gray, *l. c.* p. 374; Synops. Whales & Dolph. p. 2.

3. Physalus patachonicus.

Physalus patachonicus, *Gray, l. c.* p. 374, figs. 76–86; *Synops. Whales & Dolph.* p. 2.

Inhab. River Plata.

4. Physalus brasiliensis. B.M.

Physalus brasiliensis, *Gray, l. c.* p. 162.
Balænoptera brasiliensis, *Gray, Zool. Ereb. & Ter.* p. 5.

Inhab. Bahia.

"*Mystica* differs from the *norwegæ* in having the back black and the belly and throat furrowed. Sometimes there are white spots on the side.

"The first Whales appear in the Abrolhos waters at about the end of May, and they stay until October. The females often bring young calves with them, and appear to seek the shelter of the reefs. The headquarters of the Abrolhos fishery is at Caravellas, or, rather, at the mouth of the river Caravellas, where are situated the armações or trying-houses."—*E. Hartt, Geology and Physical Geography of Brazil*, p. 182.

"The fishery begins at Bahia, according to Castelnau (Expédition dans l'Amérique du Sud, tome i. p. 750), about the 13th of June, and lasts till the 21st September. At Caravellas I was assured that the Whales always appeared later than at Bahia, and the fishery does not always begin until the last week in June, continuing through the month of September."—*E. Hartt.*

3. CUVIERIUS.

Cuvierius, *Gray, l. c.* pp. 114, 164; *Synops. Whales & Dolph.* p. 3.

Rostrum of the skull broad, the outer sides curved, especially in front. The second cervical vertebra with two short, thick lateral processes. First rib single-headed. Sternum oblong-ovate, transverse. Hands elongate; fingers slender, second finger much longer than the forearm-bone. Scapula with a broad acromion and a rudimentary coracoid.

1. Cuvierius Sibbaldii. B.M.

Cuvierius Sibbaldii, *Gray, l. c.* p. 380; *Synops. Whales & Dolph.* p. 3.
Cuvierius latirostris, *Gray, l. c.* p. 165.
Physalus Sibbaldii, *Gray, l. c.* pp. 160 (fig. 36), 380.
Balænoptera Sibbaldii, *Van Beneden, Ostéogr. Cét.* t. 12 & t. 13. figs. 25–34.
Balænoptora carolinæ, *Malm, Monog. Illust.* t. 44.
Balænoptera musculus, *Sars, Vid. Selsk. Forhand.* 1865, t. 1, 2, & 3.
"Steypireyör," *Reinhardt, Vidensk. Meddel.* 1867; *Ann. N. Hist.* 1868.
The Grey Fin Whale, *Turner, Proc. Roy. Soc. Edin.* 1869, p. 34 (from Londonderry).

Inhab. North Sea. Mus. Hull.

The great northern Rorqual of Knox probably belongs to this species. Its skeleton is in the Edinburgh Museum.

** *Vertebræ* 58–60. *First and second ribs double-headed* (cf. p. 52); *second cervical vertebra with a broad lateral process, perforated at the base. Lower jaw compressed, with distinct coronoid process.*—Sibbaldius, *Gray, l. c.* pp. 114, 169; *Synops. Whales & Dolph.* p. 3.

4. RUDOLPHIUS.

Rudolphius, *Gray, l. c.* p. 170; *Synops. Whales & Dolph.* p. 3.
Sibbaldius, *Lilljeborg, Nova Acta Upsal.* vi. 1867.

Dorsal fin compressed, falcate, two-thirds the entire length from the nose. Ribs 13 . 13; first rib short, dilated at the external end. Sternum elongate, not narrow at posterior lobe. Fingers elongate; the second finger rather shorter than the forearm-bone. Scapula very broad, with a large broad acromion process and a moderate coracoid one.

1. Rudolphius laticeps. B.M.

Sibbaldius laticeps, *Gray, l. c.* p. 170, figs. 37, 38.
Rudolphius laticeps, *Gray, Synops. Whales & Dolph.* p. 3.
Balænoptera laticeps, *Van Beneden, Ostéogr. Cét.* t. 10 & t. 11. figs. 11–35.

Inhab. North Sea.

Nose of skull more than twice the length of brain-cavity from the nasal bones.

5. SIBBALDIUS.

Sibbaldius, *Gray, l. c.* p. 175, 1865; *Synops. Whales & Dolph.* p. 3.
Flowerius, *Lilljeborg, Nova Acta Upsal.* vi. 1867.

Dorsal fin very small, far behind, and placed on a thick prominence. Ribs 14.14; first short, sternal end very broad and deeply notched. Sternum trifoliate, with a short broad hinder lobe. Scapula broad, with very long acromion and short slender coracoid process. Fingers ——?

1. Sibbaldius borealis.

Sibbaldius borealis, *Gray, l. c.* p. 175, fig. 39; *Synops. Whales & Dolph.* p. 3.
Flowerius gigas, *Lilljeborg, Nova Acta Upsal.* vi. 1867.

Inhab. North Sea.

Mr. Flower considers *B. borealis*, Cope, Proc. Acad. Nat. Sci. Philad. 1866, p. 297, from North Atlantic, as very nearly allied to *Balænoptera Schlegelii*.

2. Sibbaldius Schlegelii.

Sibbaldius Schlegelii, *Gray, l. c.* p. 178, figs. 40–48; *Synops. Whales & Dolph.* p. 3.
Balænoptera Schlegelii, *Van Beneden, Ostéogr. Cét.* t. 14 & 15.

Inhab. Java.

Cervical vertebræ separate (t. 14. f. 5–12); the second with a broad short lateral expansion, having a moderate-sized oblong perforation. Beak of skull very long, three and a half times the length of the brain-cavity.

3. Sibbaldius ? antarcticus.

Sibbaldius ? antarcticus, *Gray, l. c.* p. 381, fig. 87; *Synops. Whales & Dolph.* p. 3.
Balænoptera antarctica, *Van Beneden, Ostéogr. Cét.* p. 234.

Inhab. Buenos Ayres.

Van Beneden regards it as a doubtful species.

4. Sibbaldius sulphureus.

Sibbaldius sulphureus, *Cope, Proc. Acad. Nat. Sci. Philad.* 1869, pp. 10, 19, f. 11.
Sulphur-bottom *of the Whalers on the North-west Coast.*

Dorsal fin very far back.

Inhab. North Pacific, north-west coast of America, California.

5. Sibbaldius tectirostris.

Sibbaldius tectirostris, *Cope, Proc. Acad. Nat. Sci. Philad.* 1869, p. 7.

Inhab. North Pacific. Skeleton, Mus. Philad.

6. Sibbaldius tuberosus.

Sibbaldius tuberosus, *Cope, Proc. Acad. Nat. Sci. Philad.* 1867, p.
Sibbaldius laticeps, *Cope, l. c.* 1866, p. 297.

Inhab. North-east coast of America.

Family 5. BALÆNOPTERIDÆ. *Pike Whales.*

Balænopterina, *Gray, l. c.* p. 114.
Balænoptera, *Gray, l. c.* p. 114; *Lilljeborg, Nova Acta Upsal.* vi.
Balænopteridæ, *Gray, Synops. Whales & Dolph.* p. 3.

Dorsal fin high, erect, compressed, about two-thirds of the entire length from the nose. Pectoral fin moderate, with four short fingers. Vertebræ 50; cervical vertebræ sometimes anchylosed. Neural canal broad, trigonal. Ribs 11 . 11. The second cervical vertebra with a broad lateral expansion, perforated at the base. First rib single-headed. Lower jaw with a conical coronoid process.

1. BALÆNOPTERA.

Balænoptera, *Gray, l. c.* pp. 114, 186; *Synops. Whales & Dolph.* p. 3.
Fabricia, *Gray, l. c.* p. 382.

The lower lateral processes of the third to the seventh cervical vertebræ with an angular projection on the lower edges. Fingers short, the length of the forearm-bone.

Scapula broad; acromion and coracoid elongate, slender.

1. Balænoptera rostrata. B.M.

Balænoptera rostrata, *Gray, l. c.* p. 188, figs. 49–53; *Synops. Whales & Dolph.* p. 3, t. 1. f. 5 (baleen), t. 2 (skull), t. 32. f. 3, 4 (cervical vertebræ); *Van Beneden, Ostéogr. Cét.* t. 12 & t. 13. figs. 1–10.

Inhab. North Sea.

2. Balænoptera velifera.

Balænoptera velifera, *Cope, Proc. Acad. Nat. Sci. Philad.* 1869, p. 18, f. 9, 10.

Dorsal fin large.

Inhab. Oregon (Finner Whale); California, Queen Charlotte's Sound.

2. SWINHOIA.

Swinhoia, *Gray, l.c.* p. 382; *Synops. Whales & Dolph.* p. 3.

The lower lateral processes of the third to the sixth cervical vertebræ slender, regularly curved, without any prominent angle on the lower edge.

1. Swinhoia chinensis. B.M.

Balænoptera Swinhoei, *Gray, l. c.* p. 382, figs. 88–93.
Swinhoia chinensis, *Gray, Synops. Whales & Dolph.* p. 3.

Inhab. Formosa.

Section II. DENTICETE (*cf.* p. 35).

Denticete, *Gray, l. c.* pp. 62, 194; *Synops. Whales & Dolph.* p. 3.
Odontoceti *or* Delphinoidea, *Flower, l. c.* p. 111.

Teeth well developed in one or both jaws, sometimes deciduous. Palate without baleen. Head large or moderate, compressed. Tympanic bones two, dissimilar, separate, becoming united, sunk in a cavity in the base of the skull. Gullet large.

The suborders in this section have certain relations to each other by which they may be arranged in two parallel series:—

	A. Nostrils separate, elongated.	B. Nostrils united, transverse.
Teeth only in the lower jaw. Cervical vertebræ often united	Physeteroidea.	Ziphioidea.
Teeth well developed in both jaws. Jaws beaked	Susuoidea.	Delphinoidea.

Division I. *Nostrils longitudinal, parallel or diverging; each covered with a valve* (cf. p. 62).

Suborder III. PHYSETEROIDEA.

Physeteroidea, *Gray, l. c.* p. 195; *Synops. Whales & Dolph.* p. 3.
Physeteridæ (Physeterinæ), *Flower, Tr. Zool. Soc.* vol. vi. p. 113.

Head blunt. Nostrils longitudinal, parallel, or diverging, each covered with a valve, the right often obliterated. Teeth many in the lower jaw, fitting into holes in the gums of the upper one. Lachrymal bone none distinct. "Costal cartilages not ossified. The hinder ribs losing their tubercular and retaining their capitular articulation with the vertebræ. The greater number of the cervical vertebræ ankylosed together. Pterygoid bones thick, produced backwards, meeting in the middle line, and not involuted to form

the outer wall of the postpalatine air-sinus. Symphysis of mandible of moderate or excessive length. No functional teeth in the upper jaw. Mandibular teeth various, often much reduced in number. Lachrymal bones usually large and distinct. Bones of the skull raised so as to form an elevated prominence or crest behind the anterior nares. Orbit of small or moderate size. Pectoral limbs small. Dorsal fin usually present."—*Flower*.

Family 6. CATODONTIDÆ.

Catodontina, *Gray, l. c.* pp. 386, 387.
Catodontidæ, *Gray, Synops. Whales & Dolph.* p. 3.

Head compressed, truncated in front, very large. Blowers separate, linear, in front of the upper part of the head. Mouth inferior, linear. Pectoral fin short, broad, truncate. Dorsal hump rounded. Skull elongate. Crown concave, surrounded by a high perpendicular wall formed by the doubled-up maxilla and occipital bones. Upper jaw toothless. Atlas free; rest of cervical vertebræ united by their bodies and spines into a consolidated mass.

1. CATODON.

Catodon, *Gray, l. c.* pp. 196, 386, 387; *Synops. Whales & Dolph.* p. 3.
Physeter, *Flower, Trans. Zool. Soc.* vol. vi. p. 309.

The atlas vertebra transverse, nearly twice as broad as high; the central canal subtrigonal, narrow below. Skull nearly one-third the entire length of the body. Lachrymal bone wanting. The zygomatic process is formed of the malar bone. Vertebral column rough and rather spongy. Vertebræ 50: 7 cervical, 11 dorsal, 8 lumbar, 24 caudal. The atlas separate; the other 6 cervical united by their bodies and spines into one consolidated mass, and sometimes united to the first dorsal vertebra. The atlas subquadrangular, broader than long. The transverse process truncated. Upper edge nearly straight, lower slightly curved. Neural canal triangular, one of the angles directed downwards. The thyro-hyal triangular, thick in front, thinner behind; the basihyal broad and flat. The basihyal and thyro-hyal united. The ribs long, all but the first slender and light. The first rib is short, broad, and very thick near the lower end. Sternum large, triangular, the apex turned backwards. The broad front end nearly straight, composed of two large anterior and a small posterior piece. Pectoral limb small. Scapula higher than broad; outer surface concave, inner convex. Acromion very large, dilated at the end. Coracoid large, narrow, and about half the length of the acromion. Humerus compressed. Radius and ulna not quite so long as the humerus, often united at the ends and

separate in the middle. The carpus wide and short. The carpal bones six, nearly in a single row. The fingers five, all well developed, the second, third, and fourth not differing greatly in length, the fourth the shortest; the first consisting of two, the second and third of six, the fourth of five, and the fifth of four joints; the second finger two-thirds the length of the arm-bones.

The skull of the young animal is much shorter and broader than in the adult (Flower, Trans. Zool. Soc. vol. vi. tab. 57).

1. Catodon macrocephalus. B.M.

Catodon macrocephalus, *Gray, l. c.* pp. 196 (f. 54), 202, 387; *Synops. Whales & Dolph.* p. 4.

Physeter macrocephalus, *Flower, Trans. Zool. Soc.* vol. vi. p. 309, tab. 55 to 61, and woodcuts.

Inhab. Tropical seas, accidentally in the temperate ones.

Mr. Flower (Trans. Zool. Soc. vol. vi.) considers *C. australis*, Gray, *l. c.* p. 206, fig. 55, the same species; and certainly there does not appear to be any character in the skeleton to divide them.

Maury remarks :—"The Sperm-Whale, according to the result of this chart, appears never to double the Cape of Good Hope. It doubles Cape Horn. Since this fish delights in warm water, shall we not expect to find off Cape Horn an under-current of warm water heavier with its salt?"—*Maury, Whale-Charts*, p. 267.

How far the species indicated range beyond the habitats whence they were received is yet to be discovered and recorded. No doubt their range is influenced by many local circumstances (peculiarities in the currents, and disposition of the food) that are not easily observed or understood.

2. MEGANEURON.

Meganeuron, *Gray, l. c.* pp. 386, 387; *Synops. Whales & Dolph.* p. 4.

The atlas vertebra subcircular, rather broader than high. The central canal subcircular, in the middle of the body, widened above.

The rest of the animal not known; it is placed in *Catodontidæ* because this family is the only one that has the atlas separate from the cervical vertebræ and of the simple form.

1. Meganeuron Krefftii.

Meganeuron Krefftii, *Gray, P. Z. S.* 1865, p. 440; *Cat. Seals & Whales*, p. 388, figs. 94–97; *Synops. Whales & Dolph.* p. 4.

Inhab. Australian seas.

Atlas 13 inches wide.

Family 7. PHYSETERIDÆ.

Physeterina, *Gray, l. c.* pp. 386, 390.
Physeteridæ, *Gray, Synops. Whales & Dolph.* p. 4.

Head depressed, rounded in front. Blowers linear (often only the one on the left side open), at the back of the forehead. Mouth small, inferior, rounded. Dorsal fin compressed, falcate. Pectoral fin elongate, falcate. Skull short; crown concave; hinder part of the wall formed by the maxillaries, and divided, as it were, into two subequal parts by a central bony ridge, which is more or less twisted towards the right side. Upper jaw toothless. Atlas and cervical vertebræ all united into a solid mass.

1. PHYSETER.

Physeter, *Gray, l. c.* pp. 196, 210, 386; *Synops. Whales & Dolph.* p. 4.

Head large, rather depressed in front. Skull ——?

Only known from Sibbald's description, which, like his others, is very specific; and all his other accounts of animals have been proved to be correct.

Mr. Flower has no faith in Sibbald's account of this animal, and says, "If the Linnæan genus *Physeter* is to be kept in abeyance until the rediscovery of Sibbald's '*Balæna macrocephala tripinna*,' it is to be feared that it may ultimately disappear altogether from zoological literature."—*Trans. Zool. Soc.* vol. vi. p. 369.

1. Physeter tursio.

Physeter tursio, *Linn., Gray, l. c.* p. 212; *Synops. Whales & Dolph.* p. 4.

Inhab. North Sea, Scotland (*Sibbald*, 1687). Length 52 or 53 feet.

2. KOGIA.

Kogia, *Gray, l. c.* pp. 196, 215, 386, 391; *Flower, Trans. Zool. Soc.* vol. vi. p. 114.

Head moderate, blunt and high in front; left blower only open. Skull short and broad; the septum that divides the crown of the skull very sinuous, folded so as to form a funnel-shaped cavity.

1. Kogia breviceps.

Kogia breviceps, *Gray, l. c.* pp. 217, 391; *Synops. Whales & Dolph.* p. 4.

Inhab. Cape of Good Hope.

Perhaps the next is the same species.

2. Kogia Macleayii. B.M.

Kogia Macleayii, *Gray, l. c.* p. 391; *Synops. Whales & Dolph.* p. 4.
Physeter simus, *Owen, Trans. Zool. Soc.* vol. vi. p. 30, t. 10, 11, 12, 13, ♀ (not skeleton, t. 11. f. 2).

Inhab. Australia, India. Length 10 feet, young.

The difference between *Kogia* and *Euphysetes* does not depend on the sex of the animals. Mr. Krefft described a male, and Professor Owen a female specimen; the latter mistook the two drawings of the same specimen for the two sexes, deceived by certain additions surreptitiously made to Mr. Elliot's drawings; but the additions, especially the penis, are not represented on the plates, and the artist (Mr. Willis) says he received no directions to leave out any part of the drawing, and accurately copied them. The measurements given in the paper do not agree with those in Mr. Elliot's notes made from the living animal; and reference to them would have prevented all this confusion.

3. EUPHYSETES.

Euphysetes, *Gray, l. c.* pp. 196, 215, 386, 392; *Synops. Whales & Dolph.* p. 4.

Head moderate, blunt and high in front. Skull short and broad. The septum that divides the cavity of the crown of the skull simple, longitudinal, only slightly curved.

Vertebræ 51: cervical 7 (all united into one mass), dorsal 14, caudal 40. Basihyal broad and flat, as in *Catodon*.

1. Euphysetes Grayii.

Euphysetes Grayii, *MacLeay*; *Gray, l. c.* pp. 218, 392; *Synops. Whales & Dolph.* p. 4.
Physeter simus, *Owen, Trans. Zool. Soc.* vol. vi. t. 11. f. 2 (skeleton only).

Inhab. Australia.

Suborder IV. SUSUOIDEA.

Susuoidea, *Gray, Synops. Whales & Dolph.* p. 4.

Head beaked. Nostrils longitudinal, each covered with a valve (the right often obliterated). Teeth in upper and lower jaws, compressed. Crown of skull covered with a bony arch. Pectoral fin broad, truncate. Fingers 4, nearly equal, the outer the shortest.

Family 8. PLATANISTIDÆ.

Platanistidæ, *Gray, l. c.* pp. 62, 220; *Synops. Whales & Dolph.* p. 4.
Platanistinæ, *Flower, Trans. Zool. Soc.* vol. vi. p. 114.

Head long-beaked. Jaws slender, compressed. Skull—crown covered with the converging arch and reflexed edges of the maxillaries. "Costal cartilages not ossified. The tubercular and capitular articulations of the ribs blending together posteriorly. Cervical vertebræ all free. Pterygoid bones thin, not conforming in their mode of arrangement with either of the other sections. Jaws very long and narrow; both with numerous teeth having compressed fangs. Symphysis of mandible very long, exceeding half the length of the entire ramus. Orbit very small. Lachrymal bones not distinct from the jugal. Pectoral limbs large. Dorsal fin rudimentary. Maxillary bones supporting large bony incurved crests. No cingulum or tubercle at the base of the crown of the teeth. Pectoral fins truncated. Visual organs rudimentary. External respiratory aperture longitudinal, linear."—*Flower.*

1. PLATANISTA.

Platanista, *Gray, l. c.* p. 221; *Synops. Whales & Dolph.* p. 4.

Vertebræ 51: cervical 7, all separate; dorsal 11; lumbar 8; caudal 25.

1. Platanista gangetica.

Platanista gangetica, *Gray, l. c.* p. 223; *Synops. Whales & Dolph.* p. 4.

Inhab. India, Ganges.

2. Platanista Indi.

Platanista Indi, *Gray, l. c.* p. 224; *Synops. Whales & Dolph.* p. 4.

Inhab. India, Indus.

Division II. *Nostrils both united into a single central transverse or crescent-shaped blower on the back of the crown* (cf. p. 57).

Suborder V. DELPHINOIDEA.

Delphinoidea, *Gray, Synops. Whales & Dolph.* p. 4.

Nostrils two, united into a single central transverse or crescentic blower on the back of the crown. Teeth in both jaws, permanent, or rarely deciduous by age. Pectoral fin lanceolate, ovate, or truncated. Head generally beaked. Dorsal fin falcate or wanting. Skull beaked; maxillary bone spread out over the orbit.

I. *Pectoral fin elongate, obliquely truncated on the inner side. Fingers elongate, longer than the arm-bones, unequal; the second and third much the longest; the rest short. Forearm-bones close together, only separated by a straight line. Carpal bones moderate, 5 or 7* (cf. p. 85).

A. *Pectoral fin on the side of the body. Second and third fingers of six or eight phalanges* (cf. p. 82).

Family 9. INIIDÆ.

Iniidæ, *Gray, l. c.* pp. 62, 226; *Synops. Whales & Dolph.* p. 4.
Platanistidæ (Iniinæ), *Flower, Trans. Zool. Soc.* vol. vi. p. 114.

Fluviatile. Head beaked; beak bristly. Teeth in the jaws, rugulose, crowns with an internal lobe; permanent. Pectoral fin large, elongate, subfalcate. Back keeled behind, without any dorsal fin. Skull—jaw compressed; symphysis of lower jaw elongate, extending for more than half its length. Overlooking the form of the blower, Mr. Flower places this genus with Platanistidæ.

Vertebræ 41. C. 7. D. 13. L. 3. C. 18. The smallest number of any Cetacean known.

"Costal cartilages not ossified. The tubercular and capitular articulations of the ribs blending together posteriorly. Cervical vertebræ all free. Pterygoid bones thin, not conforming in their mode of arrangement with either of the other sections. Jaws very long and narrow, both with numerous teeth having compressed fangs. Symphysis of mandible very long, exceeding half the length of the entire ramus. Orbit very small. Lachrymal bones not distinct from the jugal. Pectoral limbs large. Dorsal fin rudimentary." —*Flower.*

"Maxillary crests absent, or very slightly developed. Many of the teeth with a complete cingulum or a distinct tubercle at the base of the crown. Pectoral fin ovate, obtusely pointed."—*Flower.*

1. INIA.

Inia, *Gray, l. c.* p. 226; *Synops. Whales & Dolph.* p. 4; *Flower, Trans. Zool. Soc.* vi. p. 87.

Cervical vertebræ free: the first with an inferior posterior process, bifid at the end; lateral processes very short: the second with a strong dorsal process. Dorsal vertebræ with very high dorsal processes. Scapula very high, with very long acromion and coracoid processes. The arm-bone short. Forearms thick and short, scarcely so long as the upper arm-bone. Metacarpal bones seven, imbedded in cartilage. The second and third fingers very long, with six phalanges; the first finger very short, of two phalanges; the fourth strong, short, about as long as the first two phalanges of the third finger, of four phalanges; the fifth finger very short, slender, of three phalanges. The breast-bone ovate, scutate, notched in front.

1. Inia Geoffroyii.

Inia Geoffroyii, *Gray, l. c.* pp. 226, 393; *Synops. Whales & Dolph.* p. 4; *Flower, Trans. Zool. Soc.* vi. p. 87, t. 25, 26, 27 (skeleton).
Delphinus amazonicus, *Spix, Reise in Brasil.* t. iii. pp. 1119 and 1113, fig. 34 (bad).
Inia Geoffrensis, *D'Orbigny, in Ann. Mus. Paris,* vol. iii. p. 23; *Gervais, Ostéog. Cét.* t. xxxii.

Inhab. Brazil, river Amazon.

"The number of the teeth in the different specimens of *Inia* examined shows a considerable range of variation, presuming that they all belong to one species. In the one now described there are $\frac{\text{R. 26, L. 26}}{\text{R. 25, L. 27}}=104$. The larger specimen in the British Museum, from Ega, has $\frac{28-28}{26-27}=109$, and also two minute rudimentary teeth in the gum behind the last in the left maxilla. In the smaller skull from the same place there are $\frac{29-26}{28-27}=110$. In the skull in the Paris Museum, brought by D'Orbigny, there are, according to Gervais, $\frac{33-33}{33-33}=132$; but in the type specimen in the same museum, taken from Lisbon, the number is given by De Bainville as $\frac{26-26}{26-26}=104$. In the Berlin skull the teeth are $\frac{34-32}{33-32}=131$. Von Martius, in his diagnosis of the species, gives $\frac{28-28}{29-29}=114$."—*Flower.*

Family 10. DELPHINIDÆ.

Delphinidæ, *Gray, l. c.* pp. 228, 393; *Synops. Whales & Dolph.* p. 4; *Flower, Trans. Zool. Soc.* vi. p. 113.

Head beaked. Teeth in both jaws, conical or compressed, permanent, without any internal lobe, occupying nearly the whole length of the jaws. Back rounded, with a falcate dorsal fin; rarely absent. Skull with the maxilla expanded over the orbit, and more or less turned up on the edges.

"Costal cartilages firmly ossified. Posterior ribs losing their capitular articulation, and only uniting with the transverse processes of the vertebræ by the tubercle. Anterior (2–6) cervical, in most, ankylosed together. Pterygoid bones short, thin, involuted to form, with a process of the palatine bone, the outer wall of the postpalatine air-sinus. Numerous teeth in both jaws (*Monodon* excepted), sometimes deciduous. Symphysis of mandible short or moderate, never exceeding one-third the length of the ramus. Bones of the skull not raised into a distinct crest behind the anterior nares. Orbit of moderate size. Lachrymal bones not distinct from the jugal. Pectoral limbs varying much in form and size. Dorsal fin usually present."—*Flower.*

Tribe I. *STENONINA.*

Stenonina, *Gray, Synops. Whales & Dolph.* p. 5.

Head beaked, teeth conical. Beak of the skull elongate, slender, compressed. Nasal triangle short. Symphysis of the lower jaw elongate.

1. STENO.

Steno, *Gray, Cat. Seals & Whales*, pp. 230, 232, 393, 394; *Synops. Whales & Dolph.* p. 5.

Beak of the skull compressed, higher than broad. Symphysis of the lower jaw long. Marine and fluviatile. "Pectoral fin moderately long, triangular, obtusely pointed at the end. First digit short, without any bony phalange; the second with six, the third five, the fourth two, and the fifth one phalange. The carpal bones all separated by broad cartilages. Scapula oblique, truncated at the posterior angle. Acromion broad, and coracoid rather small."—*Flower.*

a. *Skull large, solid; the beak compressed, high.*

* *Teeth large, conical, about two in an inch of the length of the margin of the jaw.*

1. Steno frontatus. B.M.

Steno frontatus, *Gray, l. c.* p. 233. n. 3; *Synops. Whales & Dolph.* p. 5, t. 21. f. 7, 8.

Beak of the skull short; the front part thick, high, and blunt. Teeth 24.24, large, two in an inch.

Inhab. Indian Ocean.

2. Steno compressus. B.M.

Steno compressus, *Gray, l. c.* p. 233. n. 4; *Synops. Whales & Dolph.* p. 5, t. 27.

Beak of the skull elongate, compressed, attenuated in front. Teeth 26.26, large, two in an inch (Zool. E. & T. t. 27).

Inhab. South Sea.

Steno rostratus appears to belong to this section.

** *Teeth three in an inch.*

3. Steno chinensis.

Delphinus chinensis, *Osbeck's China*; *Gray, Cat. S. & W.* p. 266.
Delphinus sinensis, *Desmarest, Mam.* p. 514; *Flower, Trans. Zool. Soc.* vol. vii. p. 151, t. 17, 18 (skeleton).

Vertebræ 51:—C. 7. D. 12. L. 10. C. 22.

Inhab. China, Canton (*Osbeck*), Formosa (*Swinhoe*).

b. *Skull small, rather spongy. Teeth small, slender, attenuated, about four or five in an inch of the length of the margin of the jaw.*

* *Beak of the skull elongate, compressed, much attenuated and acute in front. Teeth four in an inch.*

4. Steno capensis. B.M.

Steno capensis, *Gray, l. c.* p. 394. n. 4*; *Synops. Whales & Dolph.* p. 5.

Inhab. Cape of Good Hope.

5. Steno lentiginosus. B.M.

Steno lentiginosus, *Gray, l. c.* p. 394. n. 4**; *Synops. Whales & Dolph.* p. 5; *Owen, Trans. Zool. Soc.* vi. t. 5. f. 2, 3.

Inhab. India (*W. Elliot*). Skull, B.M.

1. Steno roseiventris, *Gray, Cat. S. & W.* p. 233. no. 2.

Inhab. Moluccas. Skull not seen by me.

** *Beak of the skull short, compressed, much attenuated and acute in front. Teeth five in an inch. Flesh-coloured. Fluviatile.* Tucuxa.

6. Steno tucuxi. B.M.

Steno tucuxi, *Gray, l. c.* pp. 236, 394; *Synops. Whales & Dolph.* p. 5.

Inhab. Brazil, river Amazons, 1500 miles from the sea (*Bates*).

See also *S.* (?) *fluviatilis* and *S.* (?) *pallidus*, Gray, *l. c.* p. 237; same locality, if distinct.

*** *Beak of the skull elongate, rather depressed, broad, slightly compressed on the sides. Teeth small, five in an inch.* Stenella.

7. Steno attenuatus. B.M.

Steno attenuatus, *Gray, l. c.* pp. 235, 395; *Syn. Whales & Dolph.* p. 5.

Inhab. India.

The beak of the skull flattened (Zool. E. & T. t. 28).

This section is nearly intermediate between *Steno* and *Clymenia*.

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8. Steno fuscus. B.M.

Steno fuscus, *Gray, Synops. Whales & Dolph.* p. 5, t. 26. f. 1.

Only known from a fœtus in spirits.

2. Steno ? brevimanus, *Gray, Cat. S. & W.* p. 236.

Inhab. Banda, Singapore. Teeth $\frac{36}{36}$.

3. Steno ? coronatus, *Gray, Cat. S. & W.* p. 238.

Inhab. Spitzbergen (*Fréminville*). Not seen since 1806, and no remains of it in any museum.

4. Steno ? rostratus, *Gray, Cat. S. & W.* p. 238.
Dauphin de Breda, *Cuvier, Oss. Foss.* vol. v. p. 400.

Inhab. North Sea.

2. SOTALIA.

Sotalia, *Gray, l. c.* pp. 393, 401; *Synops. Whales & Dolph.* p. 6.

Dorsal fin distinct. Beak depressed, rather longer than the brain-cavity. Teeth slender, conical. Palate flat behind. Pectoral fin ovate, obliquely truncated at the end; hand shorter than the arm-bones. Carpal bones small. Scapula broad. Acromion broad.

Vertebræ 55:—C. 7. D. 12. L. 14. C. 22.

Scarcely distinct from *Steno*.

1. Sotalia guianensis.

Sotalia guianensis, *Gray, l. c.* p. 401; *Synops. Whales & Dolph.* p. 6.
Tursio guianensis, *Gray, l. c.* p. 257.
Delphinus guianensis, *Van Beneden, Mém. Acad. Brux.* p. 27, t. 2 (skeleton), tom. xvi. tab. 2. figs. 1 and 2.

Inhab. British Guiana.

Teeth 28 or 29. Pectoral fin very broad: fingers five; the index the longest, the thumb and little finger the least developed. The caudal vertebræ very strong. The first two of the cervical vertebræ united, the five others separate. Sternum in three pieces.

Tribe II. *DELPHININA.*

Delphinina, *Gray, Synops. Whales & Dolph.* p. 5.

Head beaked. Teeth conical. Beak of the skull elongate, longer than the brain-cavity, depressed, broad, shelving on the sides. Nasal triangle short. Symphysis of the lower jaw very short, sloping. Dorsal fin subcentral, rarely wanting.

a. *Beak elongate. Palate with a deep groove on each side behind.*

3. DELPHINUS.

Delphinus, *Gray, l. c.* pp. 230, 239, 393; *Synops. Whales & Dolph.* p. 5.

Beak elongate. Dorsal fin distinct. Teeth small, slender, five or six in an inch. Fingers elongate, unequal; the second much the longest, 8- or 9-jointed; third elongate, about three-fourths the length; the rest short.

Fœtus and tongue figured, t. 26. f. 2 of Synops. Whales and Dolph.

* *Beak of skull twice as long as the brain-case. Teeth* $\frac{5}{5}\frac{5}{5}$ *or* $\frac{5}{5}\frac{6}{6}$.

1. Delphinus longirostris. B.M.

Delphinus longirostris, *Gray, l. c.* p. 241. no. 2; *Synops. Whales & Dolph.* p. 5.

Inhab. Southern Ocean; Cape of Good Hope; Japan; Malabar.

** *Beak of skull once and a half the length of the brain-case. Teeth* $\frac{4}{4}\frac{5}{5}$ *to* $\frac{5}{5}\frac{0}{0}$.

2. Delphinus delphis. B.M.

Delphinus delphis, *Gray, l. c.* pp. 242 (n. 3), 396; *Synops. Whales & Dolph.* p. 5; *Reinhardt, Vidensk. Meddel.* 1866, t. 1.

Black, sides grey, beneath white.

Inhab. North Sea; North Atlantic; Mediterranean.

Vertebræ 75:—C. 7. D. 13. L. 24. C. 31.

3. Delphinus Moorei.

Delphinus Moorei, *Gray, l. c.* p. 396, fig. 99; *Synops. Whales & Dolph.* p. 5.

Inhab. South Atlantic.

4. Delphinus major. B.M.

Delphinus major, *Gray, l. c.* p. 396; *Synops. Whales & Dolph.* p. 5.

Inhab. ——?

5. Delphinus Walkeri.

Delphinus Walkeri, *Gray, l. c.* p. 397, fig. 100; *Synops. Whales & Dolph.* p. 5.

Inhab. South Atlantic.

Burmeister ('Anales Mus. Buenos Ayres,' i. p. 306) erroneously considers it a synonym of *D. microps*, which is a *Clymenia*.

6. Delphinus Janira. B.M.

Delphinus Janira, *Gray, l. c.* pp. 245, 398; *Zool. Ereb. & Terror*, t. 23; *Synops. Whales & Dolph.* p. 5, t. 23.

Inhab. Newfoundland.

7. Delphinus fulvifasciatus. B.M.

Delphinus fulvifasciatus, *Pucheran, Voy. Dumont d'Urville, Mamm.* t. 21. f. 1, t. 23. f. 1, 2 (skull); *Gray, Cat. Seals & Whales*, p. 252.

Inhab. Van Diemen's Land.

8. Delphinus obliquidens.

Delphinus obliquidens, *Cope, Proc. Ac. Nat. Sc. Philad.* 1869, p. 12.
Lagenorhynchus obliquidens, *Cope, Proc. Ac. Nat. Sc. Philad.* 1865, p. 177.

Inhab. North Pacific. Bottle-nose.

9. Delphinus pomeegra. B.M.

Delphinus pomeegra, *Owen, Trans. Zool. Soc.* vi. t. 6. f. 3, t. 8; *Gray, Synops. Whales & Dolph.* p. 5.

Inhab. India (*W. Elliot*) Skull, Brit. Mus.

10. Delphinus Forsteri.

Delphinus Forsteri, *Gray, Synops. Whales & Dolph.* p. 6, t. 24 (copied from *Forster's drawing*).

Skull not known.

b. *Beak elongate. Palate flat behind, without any lateral groove.*

4. CLYMENIA.

Clymene, *Gray, Cat. Seals & Whales*, p. 249; *P. Z. S.* 1864, p. 237, 1866, p. 214.
Clymenia, *Gray, Synops. Whales & Dolph.* p. 6.

Beak of skull elongate, depressed. Teeth small, slender. Nasal triangle moderate. Dorsal fin distinct. Pectoral fin falcate; hand larger than the forearm-bones. Skull elongate, slender; brain-case spherical; beak slender, elongate, longer than the brain-case; intermaxillaries convex. Teeth small, slender, five or six in an inch. The symphysis of the lower jaw short. The blowers are moderate.

* *Beak of the skull twice as long as the brain-case. Teeth five in an inch.* Micropia.

1. Clymenia stenorhyncha. B.M.

Clymene stenorhyncha, *Gray, P. Z. S.* 1866, p. 214.
Clymenia stenorhyncha, *Gray, Synops. Whales & Dolph.* p. 6.
Delphinus stenorhynchus, *Gray, Cat. S. & W.* p. 396. n. 1*.
Delphinus microps, *Gray, l. c.* p. 240.

** *Beak of the skull once and three-quarters the length of the brain-cavity. Teeth six in an inch.* Euphrosyne.

2. Clymenia microps. B.M.

Clymene microps, *Gray, P. Z. S.* 1866, p. 214.
Clymenia microps, *Gray, Synops. Whales & Dolph.* p. 6.
Delphinus microps, *Gray, Cat. S. & W.* pp. 240, 395; *Zool. Ereb. & Ter.* t. 25.

Inhab. Coast of Brazil.

3. Clymenia Alope. B.M.

Clymene Alope, *Gray, P. Z. S.* 1866, p. 214.
Clymenia Alope, *Gray, Synops. Whales & Dolph.* p. 6, t. 32.
Delphinus Alope, *Gray, Cat. S. & W.* pp. 252, 399.

Inhab. Cape Horn.

4. Clymenia Styx. B.M.

Delphinus Styx, *Gray, l. c.* p. 250.
Clymenia Styx, *Synops. Whales & Dolph.* p. 6, t. 21.

Inhab. West Africa, North Pacific.

5. Clymenia Euphrosyne. B.M.

Clymene Euphrosyne, *Gray, P. Z. S.* 1866, p. 214.
Clymenia Euphrosyne, *Gray, Synops. Whales & Dolph.* p. 6, t. 22 & t. 31.
Delphinus Euphrosyne, *Gray, l. c.* p. 251; *Zool. Ereb. & Ter.* t. 22.

Inhab. North Sea.

*** *Beak of the skull once and a half the length of the brain-case. Teeth large, four in an inch.* Gudamu.

6. Clymenia gadamu. B.M.

Clymenia gudamu, *Synops. Whales & Dolph.* p. 6.
Delphinus gadamu, *Owen, Trans. Zool. Soc.* vi. t. 3 (animal), & t. 4 (skull).

Inhab. India (*W. Elliot*). Two skulls, Brit. Mus.

**** *Beak of the skull once and a half or once and one-third the length of the brain-case. Teeth five or six in an inch.* Clymenia.

7. Clymenia normalis. B.M.

Clymene normalis, *Gray, P. Z. S.* 1866, p. 214.
Clymenia normalis, *Gray, Synops. Whales & Dolph.* p. 6.
Delphinus Clymene, *Gray, Cat. S. & W.* p. 249.

Beak of the skull once and a half the length of the brain-case, and as long as twice and one-half the width at the notch. Teeth 40, nearly six in an inch.

***** *Beak of the skull once and one-half the length of the brain-case, and as long as twice and a half the width at the notch. Teeth five in an inch.*

8. Clymenia Doris. B.M.

Tursio Doris, *Gray, l. c.* p. 255; *Zool. Ereb. & Ter.* t. 20.
Clymenia Doris, *Synops. Whales & Dolph.* p. 6, t. 20.
Clymene Doris, *Gray, P. Z. S.* 1866, p. 214.

9. Clymenia euphrosynoides. B.M.

Clymenia euphrosynoides, *Gray, Synops. Whales & Dolph.* p. 6.
Delphinus Euphrosyne, *Gray, l. c.* t. 31 (skull); *Owen, Trans. Zool. Soc.* vi. t. 8. f. 5.

****** *Beak of the skull once and one-third the length of the brain-case, and as long as twice and one-third the width at the notch. Teeth five in an inch.*

10. Clymenia dorides. B.M.

Tursio dorcides, *Gray, Cat. S. & W.* p. 400.
Clymene dorides, *Gray, P. Z. S.* 1866, p. 215.
Clymenia dorides, *Gray, Synops. Whales & Dolph.* p. 6.

Inhab. ——?

******* *Beak of the skull once and one-sixth the length of the brain-case, and as long as twice and one-half the width at the notch. Teeth five or six in an inch. The aperture of the blower large.*

11. Clymenia obscura. (Fig. 3.) B.M.

Tursio obscurus, *Gray, Cat. S. & W.* pp. 264, 400; *Zool. E. & T.* t. 16.
Clymene obscura, *Gray, P. Z. S.* 1866, p. 215, 1868, p. 147, fig. 1.
Clymenia obscura, *Gray, Synops. Whales & Dolph.* p. 6, t. 16 (skull).

Inhab. South Pacific.

Fig. 3. Fig. 4.

Pterygoid bones and hinder nasal opening of skull.

Fig. 3. *Clymenia obscura.* Fig. 4. *Clymenia similis.*

12. Clymenia similis. (Fig. 4.) B.M.

Clymene similis, *Gray, P. Z. S.* 1868, p. 147, fig. 2.
Clymenia similis, *Gray, Synops. Whales & Dolph.* p. 6.

Skull like *C. obscura*, but palate contracted behind; side of pterygoid bone keeled.
Inhab. Cape of Good Hope.

******** ——?

13. Clymenia crotaphiscus.

Clymenia crotaphiscus, *Cope, Proc. Ac. Nat. Sc. Philad.* 1865, p. 13.

Supraoccipital rounded in profile; diameter of temporal fossa shorter than the preorbital process; beak very flat, two and a half times the breadth at notch; a keel in front of the nasal meatus.
Inhab. Unknown.

14. Clymenia esthenops.

Clymenia esthenops, *Cope, Proc. Ac. Nat. Sc. Philad.* 1865, p. 12.

Outline from foramen to crest curved; cranium rounded; temporal fossa much longer than the postorbital process; width of the muzzle at notch two and a half times or less in the length.
Inhab. Unknown.

Var. Width of muzzle at notch nearly three times in the length; triangle long.
Inhab. Unknown.

5. DELPHINAPTERUS.

Delphinapterus, *Gray, Cat. Seals & Whales*, p. 276; *Synops. Whales & Dolph.* p. 6.

Beak of skull elongate, depressed. Teeth small, slender. Dorsal fin none. Bladebone very broad, nearly semicircular.

1. Delphinapterus Peronii.

Delphinapterus Peronii, *Gray, l. c.* p. 276; *Synops. Whales & Dolph.* p. 6, t. 15 (animal).

Inhab. South Atlantic, New Guinea.

c. *Beak short, thick. Palate flat behind, without any lateral groove.*

6. TURSIO.

Tursio, *Gray, l. c.* pp. 254, 400; *P. Z. S.* 1866, p. 215; *Synops. Whales & Dolph.* p. 6.

Beak of the skull only rather longer than the brain-case, conical, convex above, rounded. Teeth large. Skull high. The skull large, thick, heavy, with a high swollen brain-cavity. The beak rather longer than the brain-case, broad, conical, stout, shelving on the

Fig. 5.

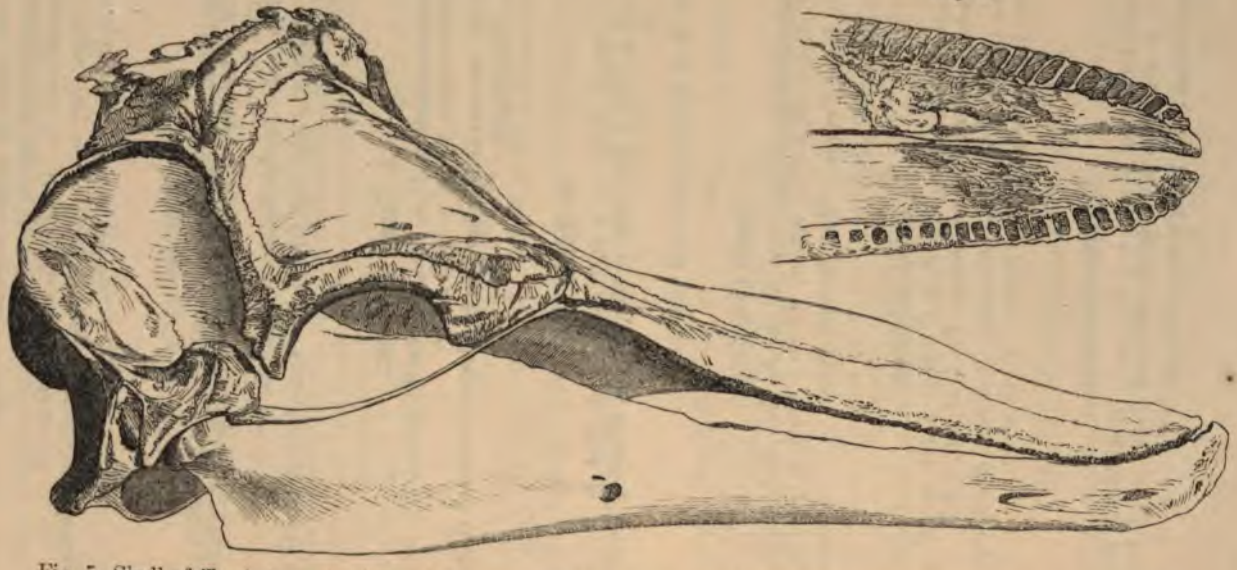


Fig. 5. Skull of *Tursio truncatus* (♂), adult.

Fig. 6.

Fig. 6. Under surface of the upper jaw, showing the worn surface.

sides. Teeth large, $\frac{22}{22}$ or $\frac{22}{25}$. The blower large. Nasal triangle produced considerably before the notch.

Vertebræ 62:—C. 7. D. 13. L. 17. C. 25.

Second finger very long; third shorter. Breast-bone formed of three pieces, linear, dilated in front.

1. Tursio truncatus. (Figs. 5 & 6.) B.M.

Tursio truncatus, *Gray, l. c.* pp. 258, 400. no. 6; *P. Z. S.* 1866, p. 215, 1868, p. 561, figs. 1, 2; *Synops. Whales & Dolph.* p. 6, (D. tursio) t. 10. f. 1.

Tursiops tursio, *Gervais, Ostéogr. Cét.* tab. 34. figs. 3-9.

Inhab. North Sea and Mediterranean. Coast of France and Cette (*Gervais*).

2. Tursio erebennus.

Delphinus erebennus, *Cope, Proc. Ac. Nat. Sc. Philad.*
Delphinus tursio, *Cope, l. c.* 1865, p. 199.

Teeth $\frac{23}{22}$; premaxillaries forming an elevated rounded ridge.
Inhab. Philadelphia.

3. Tursio Metis. B.M.

Tursio Metis, *Gray, l. c.* p. 256. no. 3; *Zool. Ereb. & Ter.* t. 18; *P. Z. S.* 1866, p. 215, 1868, p. 362; *Synops. Whales & Dolph.* p. 7, t. 18.

Inhab. West Africa.

4. Tursio Cymodoce. B.M.

Tursio Cymodoce, *Gray, l. c.* p. 257. no. 4; *Zool. Ereb. & Ter.* t. 19; *P. Z. S.* 1866, p. 215; *Synops. Whales & Dolph.* p. 7, t. 19.

Inhab. River Uragua. Mus. Buenos Ayres.

5. Tursio abusalam.

Tursio abusalam, *Gray, Cat. Seals & Whales*, p. 261. no. 7.
Tursiops aduncus, *Gervais, Ostéogr. Cét.* t. 34. figs. 1 & 2.

Inhab. Cape of Good Hope (*Gervais*); Red Sea (*Ehrenberg*).
Rather larger than *Tursiops tursio*. Teeth acute.

6. Tursio Eurynome. B.M.

Tursio Eurynome, *Gray, l. c.* p. 261. no. 8; *Zool. Ereb. & Ter.* t. 17; *P. Z. S.* 1866, p. 215; *Synops. Whales & Dolph.* p. 7, t. 17.

Inhab. South Sea; India ?, Bay of Bengal.

7. Tursio catalania. B.M.

Tursio catalania, *Gray, l. c.* p. 262. no. 10; *P. Z. S.* 1866, p. 215; *Synops. Whales & Dolph.* p. 7.

Inhab. North-west coast of Australia.

These skulls are all very much alike.

7. EUTROPIA.

Eutropia, *Gray, l. c.* p. 262; *P. Z. S.* 1866, p. 215; *Synops. Whales & Dolph.* p. 7.

Beak of the skull only rather longer than the brain-case. Skull depressed, thick, with the sides rather bent down behind the notch. The beak depressed, broad, rounded on the sides, rather longer than the length of the brain-case; the intermaxillaries flat, rather broad. Teeth small, slender, five or six in an inch.

The skull bears a considerable affinity to the skulls of *Phocæna*, *Neomeris*, *Beluga*, and *Monodon* in the bending down of the sides.

1. Eutropia Dickiei. B.M.

Eutropia Dickiei, *Gray, P. Z. S.* 1866, p. 215; *Synops. Whales & Dolph.* p. 7, t. 34.

Tursio Eutropia, *Gray, P. Z. S.* 1862, p. 145; *Cat. S. & W.* p. 262. no. 9.

Inhab. South Pacific Ocean, Chili.

2. Eutropia Heavisidii. B.M.

Eutropia Heavisidii, *Gray, P. Z. S.* 1866, p. 215; *Synops. Whales & Dolph.* p. 7.

Tursio Heavisidii, *Gray, Cat. S. & W.* p. 263.

Cephalorhynchus Heavisidii, *Gervais, Ost. Cét.* tab. 36. fig. 1 (skull).

Inhab. Cape seas.

Vertebræ 65 :—C. 7. D. 13. L. 15. C. 30.

The *D. cephalorhynchus* of F. Cuvier, judging from the figure of the skull given by Schlegel, appears also to belong to this genus.

See *Stigmatias* (*Amblyodon*), Cope, Proc. Acad. Nat. Sci. Philad. 1866, p. 294.

Tribe III. *LAGENORHYNCHINA.*

Lagenorhynchus, *Gray, Cat. S. & W.* p. 267; *Gervais, Ostéogr. Cét.* tab. 36.

Lagenorhynchina, *Gray, Synops. Whales & Dolph.* p. 7.

Head attenuated, beaked. Teeth conical. Beak of the skull as long as the length of the brain-case, broad, flat above, edges slightly reflexed and bent up in front of the notch. Nasal triangle elongate. Symphysis of the lower jaw short.

8. ELECTRA.

Electra, *Gray, Cat. S. & W.* p. 268; *Synops. Whales & Dolph.* p. 7.

The beak of the skull very flat above, with the edges in front of the notches bent up. Teeth-line stopping considerably short of the notch.

* *Beak of the skull rather longer (about one-third) than the length of the brain-case. Teeth moderate, four in an inch, those of the lower jaw rather larger.*

1. Electra obtusa. B.M.

Lagenorhynchus Electra, *Gray, l. c.* p. 268; *P. Z. S.* 1866, p. 216; *Zool. E. & T.* t. 13.
Electra obtusa, *Gray, Synopsis of Whales & Dolph.* p. 7, t. 13 (skull).

Beak tapering, rounded in front.
Inhab. —— ?

2. Electra Asia. B.M.

Lagenorhynchus Asia, *Gray, l. c.* p. 269. no. 3; *Zool. E. & T.* t. 14; *Gervais, Ostéog. Cét.* tab. 36. fig. 6.
Electra Asia, *Gray, Synops. Whales & Dolph.* p. 7, t. 14 (skull).

Beak attenuated, acute in front.
Inhab. —— ?

3. Electra fusiformis. B.M.

Electra fusiformis, *Gray, Synops. Whales & Dolph.* p. 7.
Delphinus fusiformis, *Owen, Trans. Zool. Soc.* vi. t. 5. f. 1, t. 7 (skull).

Beak broad, and rounded in front.
Inhab. India (*W. Elliot*). B.M.

4. Electra acuta.

Electra acuta, *Gray, Synops. Whales & Dolph.* p. 7.
Lagenorhynchus acutus, *Gray, Cat. S. & W.* p. 270. no. 4.
Delphinus Eschrichti, *Poelman, Ac. Roy. Belgique,* 1864, vol. xvii. t. 1.

Inhab. North Sea.
According to Schlegel's figure of the skull, it should be arranged in this section.

5. Electra breviceps.

Lagenorhynchus breviceps, *Gervais, Ostéog. Cét.* tab. 36. fig. 3.

Inhab. —— ?

** *Beak of the skull rather shorter than the length of the brain-cavity. Teeth small, five or six in an inch.*

6. Electra clancula. B.M.

Electra clancula, *Gray, Synops. Whales & Dolph.* p. 7, t. 35.
Lagenorhynchus clanculus, *Gray, Cat. S. & W.* p. 271. no. 5; *Hector, Trans. New-Zealand Instit.* 1870, p. 27.

Beak of the skull broad behind, once and three-fourths the width of the notch in length. Teeth five in an inch.

Inhab. South Pacific Ocean.

In the Museum of Wellington, New Zealand, a complete skeleton.

	ft.	in.
Total length	5	1·0
Cervical vertebræ seven, anchylosed	0	1·3
Dorsals fourteen	0	11·5

Lumbar and caudal forty-eight, thirty-four of which have processes, and may be considered lumbars.

Skull:—	in.
Length, total	14·0
Length of beak	7·5
Width at notch	3·5
Width at orbits	6·0
Width of intermaxillary at blow-hole	2·7
Width at middle of beak	2·5
Height of occiput	5·7
Length of flappers	12·0
Scapula, transverse diameter	4·5
Scapula, longitudinal diameter	6·5

This specimen was harpooned outside Wellington Harbour, and appears to be the common Dolphin of the coast.

Lower jaws of two others.

7. Electra crucigera.

Lagenorhynchus cruciger, *Gervais, Ostéogr. Cét.* tab. 36. fig. 3.

8. Electra thicolea. B.M.

Electra thicolea, *Gray, Synops. Whales & Dolph.* p. 7, t. 36.
Lagenorhynchus thicolea, *Gray, Cat. S. & W.* p. 271. no. 7.

Beak of the skull narrow behind, twice as long as the width at the notch. Teeth small, six in an inch.

Inhab. West coast of North America.

9. FERESA.

Orca (Feresa), *Gray, P. Z. S.* 1870, p. 77.

The beak of the skull from the notch rather shorter than from the notch to the condyle, depressed, flat above, gradually tapering in front; the width at the notch two-thirds of the entire length of the beak. Lower jaw slender, narrow and thin in front, teeth not reaching the notch.

This reexamination has convinced me, and also, I believe, Mr. Flower, that the skull described under the name of *Orca intermedia* belongs to a very small species, and is not "the skull of a very young individual, probably of one of the large species," as Mr. Flower supposed, apparently from the examination of the figure (see Flower, P. Z. S. 1864, p. 425). Indeed, when the animal is known, I should not be at all astonished if it should prove to be a species of *Electra* rather than of *Orca*, or perhaps a new genus.

This skull has many resemblances to those of some of the species of *Electra*; the teeth are much smaller than those of *Orca*.

1. Feresa intermedia. B.M.

Orca intermedia, *Gray, Cat. Seals & Whales*, p. 283; *Zool. Erebus and Terror*, p. 34, tab. 8 (skull); *P. Z. S.* 1870, p. 77.

Inhab. ——?

This is the skull of a full-grown animal, and yet it is not so large as the skull of a newly born specimen of *Orca*. Mr. Flower, judging from the figure, believed it to be the skull of a very young animal; but on examining the skull along with me he became satisfied, from the solidity and definite form of the bones, that it is the skull of a full-grown though not aged specimen.

10. LEUCOPLEURUS.

Leucopleurus, *Gray, P. Z. S.* 1866, p. 216; *Synops. Whales & Dolph.* p. 7.

Beak of the skull rather flat above and elongate, bent up on the edge in front of the notch, narrow behind, as long as, or slightly longer than, the length of the brain-case. Teeth-line reaching nearly to the notch. Teeth small, five in an inch. First and second cervical vertebræ united by their bodies, third and fourth by the spinous processes.

Vertebræ 81 :—C. 7. D. 15. L. and C. 59.

1. Leucopleurus arcticus. B.M.

Leucopleurus arcticus, *Gray, Synops. Whales & Dolph.* p. 7, t. 6. f. 3–5 (fœtus), t. 12 (skull), t. 26. f. 3 (tongue).

Lagenorhynchus leucopleurus, *Gray, Cat. S. & W.* p. 273. no. 9; *Gervais, Ostéogr. Cét.* t. 36. fig. 4.

Beak of the skull twice as long as the width at the notch. Teeth small, five in an inch.

Inhab. North Sea.

11. LAGENORHYNCHUS.

Lagenorhynchus, *Gray, P. Z. S.* 1866, p. 216; *Cat. S. & W.* p. 272; *Synops. Whales & Dolph.* p. 7.

Beak of the skull rather flat above, bent up on the edges in front of the notch, deep, broad behind, rather shorter than the length of brain-case. Teeth-line reaching nearly to the notch, large, three in an inch. First and second cervical vertebræ united by their bodies; the third, fourth, fifth, sixth, and seventh free.

Vertebræ 88:—C. 7. D. 14. L. and C. 67.

1. Lagenorhynchus albirostris. B.M.

Lagenorhynchus albirostris, *Gray, Cat. S. & W.* p. 272. no. 8; *Synops. Whales & Dolph.* p. 8, t. 10. f. 2, t. 11 (skull); *Gervais, Ostéogr. Cét.* tab. 36. fig. 5.

The beak of the skull once and one-half as long as the width at the notch.

Inhab. North Sea, Yarmouth.

Tribe IV. *PSEUDORCAINA.*

Head rounded in front, very convex, not beaked. Teeth conical. Beak of the skull depressed, broad, scarcely so long as the brain-cavity.

12. PSEUDORCA.

Pseudorca, *Gray, Synops. Whales & Dolph.* p. 8.

Head rounded, convex; body moderate; dorsal fin moderate, in the centre of the back; arm-bones very short and thick, the humerus rather the shortest.

Triangle in front of the blowers flat. Teeth large, conical, acute, permanent. Pectoral fin falcate. Arm-bone short, broad. Metacarpal bones five, close together. Fingers very unequal, second and third much longer than the rest, six- or seven-jointed; first finger very short, two-jointed; third finger short, four-jointed, rather longer than the first two joints of the third finger. Tooth-line of the upper jaw nearly to the notch; of the lower jaw rather shorter. Lower jaw strong. Symphysis short, about as long as the space occupied by the first four teeth. Teeth large, conical, simple.

Vertebræ 50:—C. 7. D. 10. L. 9. C. 24.

The first to the sixth cervical vertebræ united by their bodies

and dorsal processes. Bladebone broad, with large coracoid and acromion processes, which are much nearer together than usual.

* *Beak blunt, truncated in front.* Pseudorca.

1. Pseudorca crassidens.

Pseudorca crassidens, *Gray, Cat. S. & W.* p. 290. no. 1; *Synops. Whales & Dolph.* p. 8; *Gervais, Ostéogr. Cét.* t. 50. f. 7–17.

Beak about two-thirds the length of the brain-cavity, broad, rather tapering on the sides, truncated in front; teeth 8.

Inhab. North Sea.

** *Beak narrow, tapering, and rounded in front.* Neoorca.

2. Pseudorca meridionalis. B.M.

Pseudorca meridionalis, *Gray, l. c.* p. 291. no. 2, figs. 58, 59; *Synops. Whales & Dolph.* p. 8; *Gervais, Ostéogr. Cét.* t. 50.

Beak as long as the brain-cavity, tapering on the side, and rounded in front. Teeth 8.

Inhab. Van Diemen's Land.

13. ORCAELLA.

Orcaella, *Gray, l. c.* p. 285; *Synops. Whales & Dolph.* p. 7.

Head blunt, rounded, very convex. Body moderate. Dorsal fin moderate, more or less behind the middle of the back; the pectoral fin broad. Skull:—brain-case subglobular; beak very short, two-thirds the length of the brain-case, tapering, flat above. Intermaxillary half as wide as beak. Teeth small, conical, $\frac{12.12}{12.12}$ or $\frac{14.14}{14.14}$.

1. Orcaella brevirostris. B.M.

Orcaella brevirostris, *Gray, l. c.* p. 285; *Synops. Whales & Dolph.* p. 7; *Anderson's Icon. ined.* (animal and skull).
Phocæna brevirostris, *Owen, Trans. Zool. Soc.* vi. t. 9.
Globiocephalus indicus (part.), *Blyth.*

Black; body stout; dorsal fin subcentral.

Inhab. Estuaries of the Ganges (*Dr. Anderson*); Madras (*Elliot*).

2. Orcaella fluminalis.

Orcaella fluminalis, *Anderson's MS. & Icon. ined.*
Dolphin of the Irawady, *Anderson, P. Z. S.* 1870, pp. 220, 544.

"Body slender, dirty white; dorsal fin more posterior."

Inhab. River Irawady, deep channels, from 300 to 1000 miles from the sea (*Dr. Anderson*).

Tribe V. *PHOCÆNINA.*

Lateral wings of the maxilla shelving down over the orbit. Triangle in front of the blower convex. Teeth compressed.

14. PHOCÆNA.

Phocæna, *Gray, Cat. S. & W.* p. 301 ; *Synops. Whales & Dolph.* p. 8.

Dorsal fin distinct, in the middle of the back, with a series of small spines on the upper part of its front edge. Teeth all compressed, truncate.

Vertebræ 64 to 66 :—C. 7. D. 13. L. and C. 44 to 46.

1. Phocæna communis.

Phocæna communis, *Gray, l. c.* p. 302; *Synops. Whales & Dolph.* p. 8.
Var.? Phocæna tuberculifera, *Gray, l. c.* p. 304.

Inhab. North Sea.

1. Phocæna brachycium, *Cope, Proc. Acad. N. Sc. Phil.* 1865, p. 6; 1869, p. 28.

Inhab. Harbour of Salem.

2. Phocæna vomerina, *Gill, Proc. Acad. N. S. Philad.* 1865; *Cope, Proc. Acad. N. S. Philad.* 1869, p. 13.

Inhab. North Pacific. The Bay Porpoise.

15. ACANTHODELPHIS.

Acanthodelphis, *Gray, l. c.* 304; *Synops. Whales & Dolph.* p. 8.

Dorsal fin distinct, rather behind the middle of the back. Back, in front of the dorsal fin, with a single, and the upper part of the front edge of the dorsal fin with three series of oblong keeled tubercles. Teeth compressed, front one rather conical.

1. Acanthodelphis spinipinnis.

Acanthodelphis spinipinnis, *Gray, l. c.* p. 304; *Synops. Whales & Dolph.* p. 8.
Phocæna spinipinnis, *Burmeister, Anales Mus. Buenos Ayres*, vol. i. t. 23 (animal), 24 (skull).

Inhab. Coast of Brazil.

16. NEOMERIS.

Neomeris, *Gray, l. c.* p. 306; *Synops. Whales & Dolph.* p. 8.

Dorsal fin none. Head rounded. Teeth compressed, slightly notched in the middle of the crown. Pectoral fin ovate-falcate. The blade bone triangular, with a large coracoid and acromion process. The forearm-bones close together, linear. Metacarpal bones five, large. The hand rather large ; the second and third fingers

elongate, nearly equal, as long as the arm-bones, the fourth finger shorter, the first shorter, and the fifth very short.

Vertebræ 63 :—C. 7. D. 13. L. and C. 43.

1. Neomeris phocænoides.

Neomeris phocænoides, *Gray, l. c.* p. 306; *Synops. Whales & Dolph.* p. 8.

"Delphinapterus molagan," *Owen, Trans. Zool. Soc.* vi. p. 24, a name given to a manuscript note of Mr. Elliot's!

Inhab. Indian Ocean; Bengal; Cape of Good Hope; Japan.

Schlegel (Fauna Japonica, Mammalia, tab. v.) gives a detailed figure of the skull, the dorsal vertebræ, the chest-bone, and the fore limb of this animal.

B. *Pectoral fin low down on the side of the body. The second and third fingers very long, of nine or twelve phalanges* (cf. p. 63).

Family 11. GRAMPIDÆ.

Head rounded; forehead rather convex. Teeth conical; of upper jaw early deciduous, of lower jaw only in the front over the short symphysis. Dorsal fin low, rather behind the middle of the back. Pectoral fins ovate, elongate. Skull depressed, with the lateral expansions horizontal, rather thickened and bent up over the orbit and slightly dilated and bent down over the notch. Intermaxillaries dilated, swollen in front of the blower. Atlas free; rest of cervical vertebræ and dorsal processes united. The arm-bones short. Two middle fingers elongated, subequal, of eight or nine phalanges; the other fingers very short, of two or three phalanges. The breast-bone single, broad in front.

1. GRAMPUS.

Grampus, *Gray, l. c.* pp. 230, 295, 393; *Synops. Whales & Dolph.* p. 9.

† *Triangle in front of the blowers elongate, produced in front over the vomer. Bladebone triangular, the height about two-thirds the width. Beak of skull narrow, more contracted for two-thirds of its length.*

1. Grampus Rissoanus.

Grampus Rissoanus, *Gray, Cat. Seals & Whales*, p. 298; *Gervais, Ostéog. Cét.* t. 54. figs. 1–6; *Murie, Journ. Anat. & Physiol.* 1870, v. p. 129, t. 5 (good).

Beak of skull rather broad or gradually tapering towards the front; intermaxillaries rather broad; bladebone triangular, the height three-fourths the width.

Inhab. Nice.

2. Grampus Cuvieri. B.M.

Grampus Cuvieri, *Gray, l. c.* p. 295, fig. 60; *Synops. Whales & Dolph.* p. 9.
Grampus griseus, *Gervais, Ostéog. Cét.* t. 54. figs. 1-6.

Inhab. North Sea, Hampshire.

†† *Triangle in front of the blowers short, broad.*

3. Grampus Richardsonii.

Grampus Richardsonii, *Gray, l. c.* p. 299; *Synops. Whales & Dolph.* p. 9.

Inhab. Cape of Good Hope.

Family 12. GLOBIOCEPHALIDÆ.

Globiocephalidæ, *Gray, l. c.* pp. 62, 313; *Synops. Whales & Dolph.* p. 8.

Head blunt, very much swollen. Teeth in the front part of both jaws, cylindrical, simple; symphysis very short, shorter than the tooth-line. Dorsal fin falcate. Pectoral fin low down on the sides of the body; fingers elongate, many-jointed. Atlas and the rest of cervical vertebræ united, or the hinder one free. Scapula triangular, with large coracoid and acromion processes. Arm-bones very short. Metacarpal bones in cartilage. The two middle fingers very long, of twelve to ten joints; the rest of the fingers short, of three or four phalanges; index finger short, slender, four-jointed; ring-finger shorter, three-jointed; little finger very short, of one phalange. Breast-bone of three separate pierced pieces; the hinder one narrow.

1. GLOBIOCEPHALUS.

Globiocephalus, *Gray, l. c.* p. 313; *Synops. Whales & Dolph.* p. 8.

Skull:—palate flat; beak rather tapering in front. First to sixth cervical vertebræ anchylosed into one mass, seventh free.
Vertebræ 58 or 59:—C. 7. D. 11. L. and C. 40 or 41.

* *Black, with a white streak beneath.*

1. Globiocephalus svineval. B.M.

Globiocephalus svineval, *Gray, l. c.* 314; *Synops. Whales & Dolph.* p. 8.

Inhab. North Sea, coast of England. The Pilot Whale.

1. Globiocephalus melas, *Gervais, Ostéog. Cét.* t. 51.
Delphinus globiceps, *Risso, Europe Mérid.* vol. iii. f. 1.

Inhab. Mediterranean.

2. Globiocephalus affinis, *Gray, Cat. S. & W.* p. 317.

Inhab. North Sea.

3. Globiocephalus intermedius, *Gray, Cat. S. & W.* p. 318.
Globiocephalus, n. sp., *Cope, Proc. Acad. N. Sc. Phil.* 1865, p. 7.

Inhab. Delaware Bay. Teeth six above.

4. Globiocephalus Edwardsii, *Gray, Cat. S. & W.* p. 320.

Inhab. South Sea. Cape of Good Hope.

5. Globiocephalus guadaloupensis.
Globiocephalus intermedius, *Gervais, Ostéog. Cét.* t. (skull).
Globiocephalus intermedius (part.), *Gray, Cat. S. & W.* p. 319.

Inhab. Guadaloupe. Mus. Paris.

2. Globiocephalus Grayi.

Globiocephalus Grayi, *Burmeister, Ann. & Mag. N. H.* 1868, i. p. 52, t. 2. f. 2, 3; *Anales Mus. Buenos Ayres*; *Gray, Synops. Whales & Dolph.* p. 9.

Inhab. Buenos Ayres.

** *Black, or only slightly paler beneath.*

3. Globiocephalus macrorhynchus. B.M.

Globiocephalus macrorhynchus, *Gray, l. c.* p. 320; *Synops. Whales & Dolph.* p. 9; *Gervais, Ostéog. Cét.* t. 52. f. 4; *Hector, Trans. New-Zealand Instit.* 1870, p. 38.

Inhab. South Sea. New Zealand (*Gervais*).

"Two skulls in the Colonial Museum, Wellington, New Zealand, one in longitudinal section; one lower jaw; six cervical, four lumbar, thirteen caudal vertebræ; two scapulæ; two hyoids. Both skulls are of the same dimensions:—

	inches.
" Length	26
Length of nose	15
Length of tooth-series	8
Length of lower jaw	15
(This is of a different individual.)	
Width at notch	11
Width at orbit	17
Width of intermaxillary at blow-hole	7·5
Width at middle of nose	9·5
Height of occiput	14
Scapula, transverse diameter	15
Scapula, longitudinal diameter	12

" Hyoid arch 11 inches wide by 7 inches high.

" Sternum 10 × 7 inches—with three sternal ribs, each 7 inches long.

" The first rib is 10 inches from head to tip, but is bent with an arch of 5 inches.

"The atlas, axis, and three other cervicals are anchylosed. The compound cervicals have a conjoined length of 4 inches. Vertical diameter of foramen magnum $2\frac{1}{2}$ inches. Conjoined length of the four lumbars 8 inches; height, including spinous processes, 8·5 inches. Caudal apparatus, of thirteen segments, 16 inches; two of these are anchylosed. Teeth $\frac{9-9}{8-8}$."—*Hector*.

6. Globiocephalus Scammonii, *Cope, Proc. Ac. N. S. Philad.* 1869, p. 11.

Black above and below.
Inhab. North Pacific.

7. Globiocephalus australis.

Inhab. Coast of Australia. In Museum of Sydney.

8. Globiocephalus indicus, *Gray, Cat. S. & W.* p. 322.

Inhab. Bay of Bengal. Black fish.

9. Globiocephalus Sieboldii, *Gray, l. c.* p. 323.

Inhab. Japan.

10. Globiocephalus chinensis, *Gray, l. c.* p. 323.

Inhab. China.

11. Globiocephalus sibo, *Gray, l. c.* p. 323 (*sub* G. Sieboldii).

Inhab. Japan. Called "Sibo golo." Purple, with a white spot behind the dorsal fin.

2. SPHÆROCEPHALUS.

Sphærocephalus, *Gray, l. c.* p. 323; *Synops. Whales & Dolph.* p. 9.

Palate of the skull convex, shelving on the sides. Beak oblong, of nearly the same width the greater part of its length.

1. Sphærocephalus incrassatus. B.M.

Sphærocephalus incrassatus, *Gray, l. c.* p. 324, figs. 63 & 64; *Synops. Whales & Dolph.* p. 9.

Inhab. British Channel, Bridport.

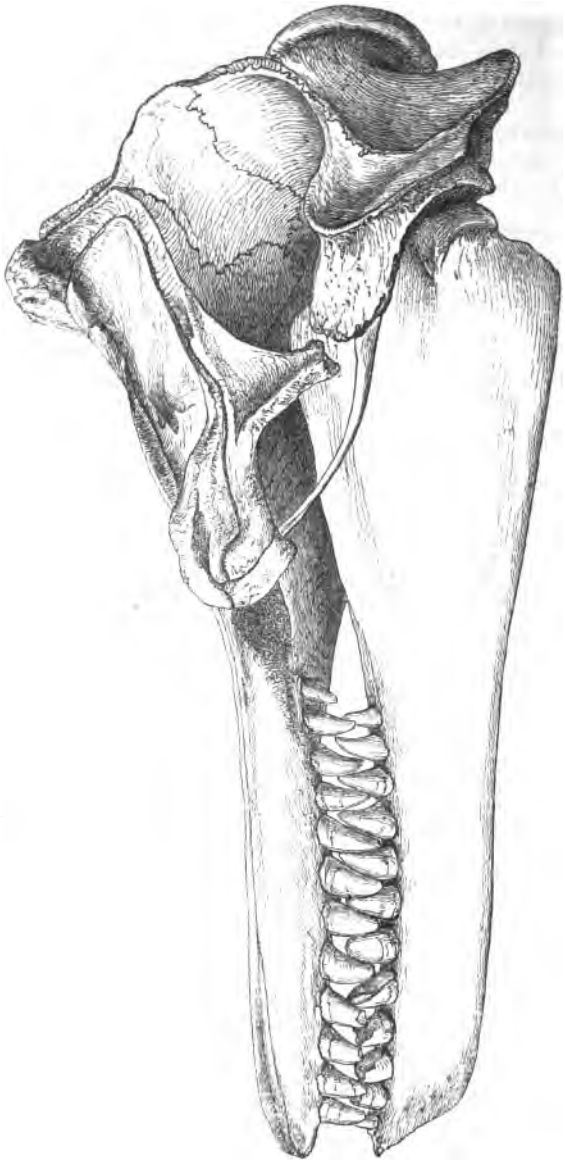
II. *Pectoral fin broad, rounded or truncated at the end; hand shorter than the arm-bones; second finger the longest, the rest gradually shorter; phalanges of the second finger six or eight* (cf. p. 63).

Family 13. ORCADÆ.

Orca, *Gray, Cat. Seals & Whales*, p. 278; *Synops. Whales & Dolph.* p. 8.

Head rounded, scarcely beaked. Dorsal fin falcate. Skull heavy; wings of sides expanded; beak short, broad; triangle in front of

Fig. 7.



Orca stenorhyncha.

Fig. 8.

Orca capensis.

Fig. 9.

Orca stenorhyncha.

Fig. 10.

Orca capensis.

the blowers flat. Lower jaw thick in front; symphysis short. Teeth large.

Vertebræ 51 or 52:—C. 7. D. 11 or 12. L. and C. 33.

The first three cervical vertebræ united into one mass by their bodies and dorsal processes, the rest more or less free. Pectoral fin broad and rounded at the end. "Carpal bone single, in a large mass of cartilage."

1. ORCA.

Orca, *Gray, P. Z. S.* 1870, p. 70.

Beak of the skull from the notch before the orbit the same length as from the notch to the condyles; the width at the notch three-fifths of the length of the beak. The occipital end of the skull slightly concave. Condyles of moderate size. Lower jaw broad on the sides, very thick and solid in front.

A. *The beak of the skull tapering and narrow in front, end narrow.* Gladiator.

1. Orca stenorhyncha. (Figs. 7 & 9.) B.M.

Orca stenorhyncha, *Gray, P. Z. S.* 1870, p. 71, figs. 1 & 3 (skull).
Orca gladiator, *Gray, Cat. Seals & Whales*, p. 279.

Inhab. North Sea. Skeleton from Weymouth, and a skull from the English coast. B.M.

Intermaxillaries narrow in the middle and rather dilated in front; but the extent of dilatation varies in the two specimens.

The examination of the four skulls of *Orca* found on the English coast show they belong to two very distinct species, one with a much more attenuated beak than the other.

B. *Beak of the skull spatulate; sides of the hinder half nearly parallel, of the front half arched and converging; end rounded, middle rather wider than at the notch.* Orca.

2. Orca capensis. (Figs. 8 & 10.) B.M.

Orca capensis, *Gray, Cat. Seals & Whales*, p. 283; *P. Z. S.* 1870, p. 71, figs. 2 & 4.
Delphinus orca, *Owen.*
Grampus gladiator, *Smith, South-African Zool.* p. 126.

Inhab. Cape of Good Hope (*Viney*, B.M.; *Villette*, Mus. Coll. Surg. no. 1139); Seychelles Islands (*Swinburne Ward*).

In the Cape specimen the intermaxillaries are nearly of the same width in the whole of their length; in the Seychelles skull they are contracted in the greater part of their length, and rather dilated in front.

Mr. Swinburne Ward has kindly sent a very beautiful skull of a "Killer" taken in the sea near the Seychelle Islands.

To determine this skull I have been induced to compare the skulls of the genus in the British Museum, which it is very necessary to do from time to time, as specimens gradually accumulate, and often arrive when I am occupied on other subjects, and consequently are put aside for future examination.

In this examination I have observed that in the 'Catalogue of Seals and Whales' I have confounded with the skull described under the name of *Orca capensis* one from the North Pacific, the former being the true *Orca capensis*, and the skull now received from the Seychelles Islands being of the same species.

The skull figured in the 'Zoology of the Erebus and Terror' under the name of *O. capensis* is from a specimen received from the Zoological Society, to which it was presented by Capt. Delville, who said he obtained it in the North Pacific (?). It is quite a different species, for which I propose the name of *Orca pacifica*. I doubt its being from the *North* Pacific, as I believe there is a skull of the same species in the Paris Museum, collected by M. Eydoux, and said to have come from Chili.

3. Orca africana.

Orca gladiator, var. australis, *Gervais, Ostéogr. Cét.* t. 47. f. 2.

Inhab. Algoa Bay.

Skull much smaller, 24 inches long.

4. Orca latirostris. B.M.

Orca latirostris, *Gray, P. Z. S.* 1870, p. 76.
Orca gladiator, *Gervais, Ostéogr. Cét.* t. 48. f. 2, 3.
Delphinus orca, *Cuv. Oss. Foss.* v. tab. 22. fig. 4 (skull).

The skull very similar to that of the Cape species, but much smaller; but the beak is rather narrower, the intermaxillaries moderately broad, slightly dilated in front.

Inhab. North Sea.

An adult skull from the coast of Essex (361 *a*), and another without the lower jaw, are in the British Museum.

These skulls of the smaller British, or, rather, European *Orca* are distinguishable from those of *O. gladiator* by the smaller size and the broader, rounder nose—and from the skulls of the Cape-of-Good-Hope species by being of a much smaller species, and having a depressed crown of the head.

I believe the skull figured under the name of *Delphinus orca* by Cuvier, Oss. Foss. vol. v. tab. 22. figs. 3, 4, represents this species, from the form of the beak and the narrowness of the occiput: this figure has been copied by various British and other authors.

1. Orca gladiator, var. arcticus (O. Eschrichtii), *Gervais, Ostéogr. Cét.* t. 47. fig. 3.

Inhab. Faroe Islands.

2. Orca gladiator, var. europæus, *Gervais, Ostéogr. Cét.* t. 47. f. 4.
Orca gladiator, *Gervais, l. c.* t. 48. f. 1.

Inhab. the Atlantic.
Skull about 40 inches long.

3. Orca gladiator, var. europæus, *Van Beneden & Gervais, Ostéogr. Cét.* t. 47. f. 5.
Delphinus orca, *Gervais, Zool. et Paléont. Française,* t. 37. f. 3, 4.

Inhab. Mediterranean, Cette.
Skull about 22 inches long. It is about the same size as the *Orca* from Algoa Bay; but the brain-cavity is rather broader and the beak is not so acute in front.

Gervais, in the 'Zoology and Paleontology of France,' figures the skull of a young *Delphinus orca*, taken on the coast of Cette, which is now in the Museum of Paris. It appears to belong to this species; or it may be that the *Orca* of the Mediterranean does not grow to the usual size; or, again, it may be of a different species; for the skull is only fifty-eight centimetres long and thirty broad.

5. Orca magellanica.

Orca magellanica, *Burmeister, Ann. & Mag. Nat. Hist.* ser. 3. xviii. p. 101, t. 9. f. 5; *An. Mus. Publ. de Buenos Ayres,* i. p. 373, tab. 22; *Gray, Synops. Whales & Dolph.* p. 8; *P. Z. S.* 1870, p. 76.

Inhab. Patagonia. Mus. Buenos Ayres.
This species, according to the figure, is very like *Orca latirostris.*

6. Orca tasmanica.

Orca gladiator, var. australis, *Gervais, Ostéogr. Cét.* t. 47. fig. 1.

Inhab. Tasmania. Skull about 32 inches long.

7. Orca rectipinna.

Orca rectipinna, *Cope, Proc. Acad. Nat. Sci. Philad.* 1869, p. 12.

No white spot behind eye.
Inhab. California.

8. Orca atra.

Orca ater, *Cope, l. c.* 1869, p. 12.

Black above and below, with white spot behind eye.
Inhab. Oregon, Aleutian Islands.

The following are the measurements of the different skulls of the

genus in the collection of the British Museum; they were carefully taken with calipers by Mr. Edward Gerrard.

	O. stenorhyncha.				*O. capensis.*		*O. latirostris.*		*O. pacifica.*		*O. intermedia.*	
	361 *b*.		361 *c*.		1065 *b*, *c*.		361 *a*.		1065 *a*.		362 *a*.	
	in.	lin.	in.	lin.	in.	lin.	in.	lin.	in.	lin.	in.	lin.
Length from end of nasal to centre of occipital condyle	35	0	37	0	39	0	33	0	36	6	14	0
Length of nose	17	6	18	6	22	6	17	0	18	0	7	0
——— of tooth-line	13	6	14	0	16	0	13	0	14	6	4	9
——— of lower jaw	27	6	30	0	31	0	26	0	29	6	11	3
Breadth at the notch	10	6	11	0	12	0	10	0	12	6	4	9
——— at the orbit	18	0	19	6	20	0	18	0	21	0	8	6
——— at temple above	18	0	19	6	20	0	18	0	20	0	9	0
——— at middle of beak	9	0	10	0	11	0	9	6	10	0	3	6
——— at intermaxillaries	3	3	3	3	4	6	3	3	3	6	0	9

2. OPHYSIA.

Ophysia, *Gray*, *P. Z. S.* 1870, p. 76; *Synops. Whales & Dolph.* p. 8.

Skull:—beak from the notch before the orbit the same length as from the notch to the condyle; width at the notch two-thirds the entire length of the beak. Intermaxillaries very narrow, slightly dilated in front; brain-cavity broad; occiput deeply concave. Lower jaw very broad on the sides, very thick and solid in front.

1. Ophysia pacifica. B.M.

Ophysia pacifica, *Gray*, *P. Z. S.* 1870, p. 76.
Delphinus globiceps, *Grant*, *P. Z. S.* 1833, p. 65.
Delphinus orca, *Eydoux*, *Mus. Paris.*
Orca capensis, *Gray*, *Zool. Ereb. & Terr.* p. 34, tab. 9, not *Cat. Seals & Whales*, p. 283; *Gervais*, *Ostéogr. Cét.* t. 48. fig. 1.
Orca (Ophysia) capensis, *Gray*, *Synops. Whales & Dolph.* p. 8, tab. 9 (skull).

Inhab. North Pacific (*Capt. Delville*, *R.N.*).
Skull, from the Zoological Society's collection.

Family 14. BELUGIDÆ.

Beluginæ, *Flower*, *Trans. Zool. Soc.* vi. p. 115.

Head rounded in front. Teeth in both jaws more or less early deciduous, rarely wanting or, rather, not developed. Back without any dorsal fin. Pectoral fin small, ovate. Skull with the lateral expansion of the maxilla over the orbit, and the side of the beak, shelving downwards. Fingers short; index and middle fingers nearly the same length, the rest rather shorter; phalanges 2, 5, 6, 4, 3. Cervical vertebræ generally free; the second with a large dorsal process.

"The Narwhal and the *Beluga* appear to separate themselves from all the rest, by certain well-marked structural conditions, especially the characters of the cervical vertebræ. As these two animals are in almost every part of their skeleton nearly identical, even to the number of the vertebræ and phalanges, I am disposed to look upon the exceptional dentition of the former as an aberration of secondary importance, and to unite the two genera into a distinct subfamily, placing it next to the Platanistidæ."—*Flower, l. c.* p. 114.

1. BELUGA.

Beluga, *Gray, Cat. S. & W.* pp. 231, 306, 393; *Synops. Whales & Dolph.* p. 9.

Lateral wing of the maxilla over the orbit shelving downward. Teeth conical in both jaws, early deciduous. Male without any spiral horn-like tooth. Fingers short. Metacarpal bones surrounded with cartilage. Bladebone with large coracoid and acromion processes. Second cervical vertebra with a large dorsal process.

Vertebræ 50:—C. 7. D. 10. L. and C. 33.

1. Beluga catodon. B.M.

Beluga catodon, *Gray, l. c.* p. 307, fig. 61; *Synops. Whales & Dolph.* p. 9, tab. 29. f. 3 (tongue).

Delphinus canadensis, *Gray, Synops. Wales & Dolph.* t. 5 (head false, with beak).

Beluga albicans, *Gervais, Ostéogr. Cét.* t. 44. f. 1–5.

Delphinapterus, *Lucas, Vidensk. Selsk. Skr.* Række 5, Band ix. tab. 8 (skull and teeth, showing how they are worn).

Inhab. North Sea, mouths of rivers.

1. Beluga rhinodon, *Cope, Proc. Acad. Nat. Sci. Philad.* 1865, p. 5, 1869, p. 13, fig. 1.

Inhab. Arctic seas.

2. Beluga declivis, *Cope, Proc. Acad. Nat. Sci. Philad.* 1865, p. 5, 1869, p. 14.

Inhab. Arctic seas.

3. Beluga angustata, *Cope, Proc. Acad. Nat. Sci. Philad.* 1869, p. 20, figs. 2 & 3.

Beluga concreta, *Cope, Proc. Acad. Nat. Sci. Philad.* 1865, p. 5.

Inhab. Arctic seas.

These are probably varieties of *B. catodon*, showing that the attachment of the cervical vertebræ, the number of ribs, and the form of the acromion are liable to vary.

4. Beluga canadensis, *Wyman, Proc. Bost. Soc. Nat. Hist.* 1865.

Inhab. Canada.

I believe it to be the same as the former.

2. Beluga Kingii.

Beluga Kingii, *Gray, Cat. S. & W.* p. 309; *Synops. Whales & Dolph.* p. 9, t. 7.

Inhab. Australia.

2. MONODON.

Monodon, *Gray, l. c.* pp. 231, 310; *Synops. Whales & Dolph.* p. 9.
Monoceros, *Gray, Cat. S. & W.* p. 393.

Lateral expansion over the orbit shelving down. Teeth in both jaws very early deciduous. Male with one, rarely two, very long, projecting, spiral tusks in the left side of the upper jaw. Cervical vertebræ:—first free, thin; second and third united by the spinal processes. Bladebone with large coracoid and acromion processes. Fingers short.

Vertebræ 50:—C. 7. D. 11. L. 6. C. 26.

"In the skeleton of two males in the Museum of the College of Surgeons, the bodies of the second and third cervical vertebræ are firmly united."—*Flower.*

1. Monodon monoceros. B.M.

Monodon monoceros, *Gray, l. c.* p. 311; *Synops. Whales & Dolph.* p. 9; *Gervais, Ostéogr. Cét.* t. 44. f. 6–9.

Inhab. North Sea.

Family 15. PONTOPORIADÆ.

Head long-beaked. Beak slender, smooth. Nostrils on the nape, crescent-shaped. Teeth in both jaws permanent, conical, with a swollen ring round the base. Dorsal fin short, trigonal. Pectoral fin short, truncated. Fingers 5, nearly equal; the thumb very short, of one joint; the index finger the longest, the rest gradually shorter to the little finger. Bladebone broad, with two ridges. Skull long-beaked, the beak compressed. Lower jaws united together nearly to the base. Cartilages of ribs ossified.

Vertebræ 42:—C. 7. D. 10. L. 7. C. 18.

1. PONTOPORIA.

Pontoporia, *Gray, Cat. S. & W.* pp. 230, 231 & 393; *Synops. Whales & Dolph.* p. 5; *Flower, Trans. Zool. Soc.* vi. p. 87; *Burmeister, An. Mus. P. Buenos Ayres*, p. 389.
Stenodelphis, *Gervais*, 1847.

Beak of the skull high, compressed. Symphysis of the lower jaw very long.

1. Pontoporia Blainvillii. B.M.

Pontoporia Blainvillii, *Gray, l. c.* p. 231; *Synops. Whales & Dolph.* p. 5, t. 29 (skull); *Flower, Trans. Zool. Soc.* vi. p. 106, t. 28 (skull); *Burmeister, An. Mus. P. Buenos Ayres*, i. p. 387, tab. 23 (animal), tab. 25 & 26 (skeleton).

Inhab. South Atlantic, Monte Video.

The animal figured by Gervais as *Delphinus* (*Stenodelphis*) *Blainvillii* (Voy. Amér. Mérid. t. 23) differs from Burmeister's figure in having an elongated subfalcate pectoral fin, and a higher dorsal, and a broad white streak, commencing from the blower and extending down the back to near the tail. If this is not a figure of the animal seen at sea, which I suspect it must be, it must be a different species.

Suborder VI. ZIPHIOIDEA.

Ziphiidæ, *Gray, Cat. S. & W.* p. 326.
Ziphioidea, *Gray, Synops. Whales & Dolph.* p. 9.

Head beaked. Nostrils two, united into a single transverse or crescent-like blower on the centre of the back of the crown. Teeth only in the front or sides of the lower jaw, fitting into pits in the upper one. Dorsal fin falcate. Pectoral fin ovate, small, low down on the side of the body: fingers short, 4- or 5-jointed; second and third the longest; fourth rather shorter; first and fifth rather short. Cervical vertebræ more or less united into one mass.

Family 16. HYPEROODONTIDÆ.

Hyperoodontina, *Gray, l. c.* p. 327.
Hyperoodontidæ, *Gray, Synops. Whales & Dolph.* p. 9.

Blower lunate. Beak of the skull with a high crest on each side above, formed by the elevation of the maxillary bones in front of the blower. Teeth 2 or 4, in front of the lower jaw, conical. Cervical vertebræ united into one mass.

1. HYPEROODON.

Hyperoodon, *Gray, l. c.* pp. 327, 328; *Synops. Whales & Dolph.* p. 9.

Beak of the skull bent downwards: crest of the back of the beak sharp-edged, above as high as the occiput.

Vertebræ 44 or 45:—C. 7 (all united into one solid mass). D. 9. L. 10. C. 18 or 19.

1. Hyperoodon butzkopf. B.M.

Hyperoodon butzkopf, *Gray*, *l. c.* p. 330; *Synops. Whales & Dolph.* p. 9, t. 3.

Hyperoodon rostratum, *Reinhardt*, *in Eschricht's Vid. Selsk.* v. t. 7 (male fœtus and skeleton); *Gray*, *Synops. Whales & Dolph.* t. 3. f. 1–4.

Inhab. North Sea.

1. Hyperoodon semijunctus, *Cope*, *Proc. Acad. Nat. Sci. Philad.* 1865, p. 15 (280), 1869, p. 21.

Inhab. Charlestown Harbour.

Most likely a variety of *H. butzkopf*.

2. LAGENOCETUS.

Lagenocetus, *Gray*, *l. c.* pp. 327, 336; *Synops. Whales & Dolph.* p. 9.

Beak of the skull straight, erect, very large, flattened, higher than the occiput.

1. Lagenocetus latifrons. B.M.

Lagenocetus latifrons, *Gray*, *l. c.* p. 339; *Synops. Whales & Dolph.* p. 9.

Hyperoodon latifrons, *Gray*, *Zool. Ereb. & Ter.* t. 24; *Reinhardt*, *in Eschricht's Vidensk. Selsk. Skr.* v. t. 6 (skull).

Inhab. North Sea.

"Plate 6 represents the skull of a male of *Hyperoodon latifrons* (Gray), from the Färöer, of which the complete skeleton, 25 feet long, is preserved in the University's Museum.

"Eschricht believed, as is known, that *H. latifrons* was established on a very old male of the common Dögling, *Hyperoodon rostratus*; but Gray's species must now be regarded as well grounded.

"Plate 7 represents the male (fœtus) of the common *H. rostratus*. All figures of half the natural size."—*Reinhardt*.

Family 17. EPIODONTIDÆ.

Epiodontina, *Gray*, *Cat. S. & W.* p. 327.

Epiodontidæ, *Gray*, *Synops. Whales & Dolph.* p. 9.

Blower lunate. Skull:—beak simple; maxillaries not dilated above; intermaxillaries enlarged behind, forming a more or less deep cavity round the nostrils. Teeth 2 or 4 in front of the lower jaw, conical or cylindrical. Cervical vertebræ:—first, second, and third united into one mass, which is produced and truncated above; the rest thin, free.

1. EPIODON.

Epiodon, *Gray, l. c.* pp. 327, 340; *Synops. Whales & Dolph.* p. 10.

Skull:—vomer simple, small; intermaxillaries elevated, and forming a moderately deep, well-marked basin round the nostrils. Fingers 5; carpal bones 6; phalanges 2, 3, 4, 3, 3. Sternal bones separate from the front, lanceolate. Vertebræ 42; the "front caudal with chevron bones. First four cervical vertebræ united by their bodies into one mass" (Ostéog. Cét. t. 22. f. 4).

1. Epiodon Desmarestii.

Epiodon Desmarestii, *Gray, l. c.* p. 341; *Synops. Whales & Dolph.* p. 10.
Ziphius aresques, *Gervais, Ostéog. Cétac.* t. 21. f. 1–4.
Ziphius decavirostris (de Z. aresques), *Gervais, Ostéog. Cét.* t. 22. f. 4–11.
Ziphius cavirostris, *Gervais, Zool. et Paléon. Française,* t. 38. f. 1, t. 39. f. 2–7.

Inhab. North Sea and Mediterranean, Hérault.

2. Epiodon australis.

Ziphiorrhynchus cryptodon, *Burmeister, Ann. & Mag. N. H.* 1866, xvii. p. 94, t. 3.
Epiodon cryptodon, *Burm. l. c.* p. 303, t. 6; *Gray, Synops. Whales & Dolph.* p. 10.
Delphinorhyncus australis, *Burmeister, Zeitsch. Nat.* vol. xxvi. 1865, p. 262; *An. Mus. Buenos Ayres,* t. 15–21.
Ziphius de Buenos Ayres, *Gervais, Ostéog. Cét.* t. 31. f. 5.

Inhab. Buenos Ayres.
Vertebræ 49: cervical 7, dorsal 10, lumbar 12, caudal 20.

2. PETRORHYNCHUS.

Petrorhynchus, *Gray, Cat. S. & W.* pp. 327, 342; *Synops. Whales & Dolph.* p. 10.

Skull trigonal. Vomer swollen, forming a large, elongated tubercle between the callous intermaxillaries. Intermaxillaries forming a deep basin round the nostrils.

1. Petrorhynchus mediterraneus.

Ziphius cavirostris, *Gervais, Zool. et Paléon. Franç.* t. 38. f. 2, t. 39. f. 1.
Ziphius du Canton Gironde, *Ostéog. Cét.* t. 21. fig. 6.
Ziphius fos. des Bouches du Rhône, *Ostéog. Cét.* t. 21. f. 7.
Ziphius de Corse, *Ostéog. Cét.* t. 21. figs. 8, 9.

Inhab. Mediterranean.

2. Petrorhynchus capensis. B.M.

Petrorhynchus capensis, *Gray, l. c.* p. 346, figs. 67, 68; *Synops. Whales & Dolph.* p. 10.

Ziphius indicus, *Van Beneden*; *Gray, Cat. S. & W.* p. 346, fig. 69.
Ziphius du Cap-de-Bonne-Espérance, *Gervais, Ostéog. Cét.* t. 21. f. 10.
Ziphius de la mer des Indes, *Gervais, Ostéog. Cét.* t. 21. f. 11–13.

Inhab. South Sea. Cape sea (*H. Layard*).

Though M. van Beneden's figure (copied in Cat. Seals & Whales, p. 347. f. 69) is so unlike the figure of *Petrorhynchus capensis* in the Cat. Seals & Whales, pp. 344 & 345. figs. 67 & 68, yet the cast of the beak of M. van Beneden's specimen resembles the latter figure and our specimen.

Family 18. ZIPHIIDÆ.

Ziphiina, *Gray, Cat. S. & W.* pp. 327, 348.
Ziphiidæ, *Gray, Synops. Whales & Dolph.* p. 10.

Skull beaked. Maxillaries not dilated above. Intermaxillaries linear, rather swollen on the sides of the nostrils. Teeth on the sides of the lower jaw compressed. Cervical vertebræ more or less united into a consolidated mass.

* *Symphysis of the lower jaw produced behind the teeth.*

1. BERARDIUS.

Berardius, *Gray, l. c.* pp. 327, 348; *Synops. Whales & Dolph.* p. 10.

Teeth 2 . 2, in the front of the sides of the lower jaw, conical, compressed. Lower jaw gradually tapering in front. Symphysis moderately long, as far from the hinder tooth as from the tip.

1. Berardius arnuxi.

Berardius arnuxi, *Gray, l. c.* p. 348, fig. 70; *Synops. Whales & Dolph.* p. 10; *Gervais, Ostéog. Cét.* t. 23 (skull).

Inhab. New Zealand.

"Skull and lower jaw, a cervical vertebra, scapula, hyoid, paddles, and pelvic bones of one individual.

"Single tooth of another individual, weight 206 grains.

	in.
"Length of head	$23\frac{1}{2}$
Length of nose	17
Length of dental groove	7
Length of lower jaw	19
Width at notch	$5\frac{1}{2}$
Width at orbits	$9\frac{1}{2}$
Width of intermaxillary at blow-holes	$4\frac{1}{2}$
Width of nose	2
Height of occiput	$9\frac{1}{2}$

"One small tooth imbedded close to the tip of lower jaw on left side, 1 inch high, weight $38\frac{4}{5}$ grains, irregular triangular shape.

"This is the skull of a young animal. A groove containing a strong ligament connecting the muscle of the forehead with the snout is deeply imbedded in the intermaxillary groove. The snout is described as long and flexible. Atlas and axis anchylosed. Length of cervical vertebræ $3\frac{7}{10}$ inches. Scapula, longitudinal diameter 10 inches, transverse diameter 6 inches. Paddles, length 14 inches, width $3\frac{1}{2}$ inches. Hyoid arch $5\frac{1}{2} \times 4$ inches high. Pelvic bones $2\frac{1}{2}$ inches.

"The specimen was cast on the beach on the west coast, and prepared by Dr. Knox."—*Hector.*

"Your *Berardius* proves to be quite different from the first one we got, both in the dentition and form of the skull. We have had several good papers on it from Dr. Knox. He has made a beautiful preparation, showing that the tooth does not pass through the gum."—*Dr. Hector*, letter dated 30th October, 1870.

"A fine specimen of *Berardius arnuxi* has been cast ashore on the coast of Canterbury, New Zealand. It was made into a skeleton, which is now in the museum at Canterbury. The skeleton is complete, only wanting one of the pelvic bones. It was 30 feet long, and a young animal; not a single epiphysis is anchylosed. The cervical vertebræ, which, in the old animal evidently form a compact mass, are still partly free; the first three vertebræ (including the atlas) anchylosed, and of these the first two completely, and of the second and third the neural arches are as yet not completely united into one bone. It has ten ribs."—*Julius Haast.*

The animal was 30 feet 6 inches long.

Deep velvet-black, belly greyish, tail with two falcate lobes $6\frac{1}{2}$ feet broad. The pectoral fins are a little above the middle of the body, 17 inches broad and 19 inches long, of a triangular form. Dorsal fin small, falcate, not very far from the chin (?). "The animal has the power of protruding the four teeth at will." They live on cephalopods. The stomach contained about a half-bushel of the horny beaks of the *Octopus*, which were nearly all the same size. It was evidently a young animal, as all the disk-like epiphyses of the vertebræ are still separate, as was the case with the limb-bones.

The seven cervical vertebræ were beginning to coalesce; the first three are already anchylosed, the first two completely, and the second and third only partially, as the neural arches and transverse processes are not yet united in one bone. It has ten dorsal vertebræ; the lumbar and caudal vertebræ were not observed. (Dr. Haast, Annals & Mag. Nat. Hist., Oct. 1870.)

** *Symphysis of the lower jaw to or nearly to the teeth.*

2. ZIPHIUS.

Ziphius, *Gray, l. c.* pp. 327, 348; *Synops. Whales & Dolph.* p. 10.
Micropteron, *Flower, l. c.* p. 328.

Teeth 2, in the middle of the sides of the lower jaw. Teeth of

the male large, short, compressed, truncated at the end; of female small, curved. Lower jaw often with sundry rudimentary teeth, gradually tapering in front; symphysis elongate, and reaching to the middle of the teeth in the male, and beyond it in the female. Cervical vertebræ free. Scapula with large coracoid and acromion processes.

Vertebræ 46:—C. 7. D. 10. L. 10. C. 19.

"*Micropteron*: cervical vertebræ all united in one solid mass." —*Flower, l. c.* p. 328.

1. Ziphius Sowerbiensis. B.M.

Ziphius Sowerbiensis, *Gray, l. c.* p. 350, fig. 71; *Synops. Whales & Dolph.* p. 10, tab. 5. f. 3, 4 (skull).
Mesoplodon Sowerbiensis, *Gervais, Ostéog. Cét.* t. 22 & 23 (skull and ear-bone); *Van Beneden, Mém. de l'Acad. Brux.* vol. x. t. 3.
Dioplodon Sowerbiensis, *Gervais, Zool. et Paléont. Française*, t. 30. f. 1.

Inhab. British Channel. Irish Sea.

3. DOLICHODON.

Dolichodon, *Gray, l. c.* p. 353; *Synops. Whales & Dolph.* p. 10.

Teeth 2, in the middle of the sides of the lower jaw. Teeth (of male) very long, strap-shaped, produced, arched obliquely, truncated at the end, with a conical process on the front of the terminal edge. Lower jaw weak, very slender in front. Symphysis elongate.

1. Dolichodon Layardii. B.M.

Ziphius Layardii, *Gray, l. c.* p. 353, fig. 72.
Dolichodon Layardii, *Gray, Synops. Whales & Dolph.* p. 10.

Inhab. Cape of Good Hope (*H. Layard*).

4. NEOZIPHIUS.

Teeth 2, in the front of the lower jaw, with a compressed, short, triangular crown. Lower jaw strong, rather narrow in the middle, and suddenly tapering in front of the tooth. Symphysis to the back edge of the teeth.

1. Neoziphius europæus.

Dioplodon europæus, *Gervais, Ostéog. Cét.* t. 24 (skull).

Inhab. Mediterranean.

5. DIOPLODON.

Dioplodon, *Gray, l. c.* pp. 327, 355; *Synops. Whales & Dolph.* p. 10.

Teeth 2 or 4, conical, in the middle of the sides of the lower jaw. Lower jaw broad behind, suddenly contracted in front. Symphysis moderate, not reaching halfway to the teeth.

1. Dioplodon sechellensis.

Ziphius sechellensis, *Gray, Synops. Whales & Dolph.* t. 6. f. 1, 2 (skull).

Dioplodon sechellensis, *Gray, Cat. S. & W.* p. 355; *Synops. Whales & Dolph.* p. 10, t. 5. f. 4; *Ann. & Mag. N. H.* 1870, vi. p. 343, fig. (skeleton); *Gervais, Ostéog. Cét.* t. 25 (skull).

Dioplodon densirostris, *Gervais, Zool. Paléont. Franç.* t. 43. f. 3–6.

Inhab. Seychelles. Mus. Paris. Lord Howe's Island (*Krefft*).

The form of the lower jaw gives a very peculiar appearance to the skeleton. The cervical vertebræ are united together by their bodies and large dorsal spines, the latter forming a thick conical process. The bodies of the dorsal vertebræ are very small, enlarging in size towards the tail; they are thirty-six in number. The four terminal caudal ones are very small, forming a kind of cylindrical process. There are eight chevron bones. The thoracic cavity is small. There are twelve ribs on each side. The dorsal processes of the first eighteen vertebræ have an anterior basal process, which becomes gradually smaller.

Upper arm-bone very slender, slightly curved; the lower arm-bones moderate, straight, parallel to each other, and rather longer than the upper arm-bone. The ribs very broad at the upper end, and gradually tapering towards the chest, where they are nearly cylindrical.

"The total length of the skeleton, without cartilage, is 14 feet 8 inches; the head measures 2 feet $5\frac{1}{2}$ inches in length, and the lower jaw 2 feet 3 inches in length. The first three cervical vertebræ are anchylosed; the next one is more or less free; and the remaining three are anchylosed again. The dorsals are ten in number, the last bearing a short rib 8 inches in length. Five of these ribs are jointed direct to the sternum; the following two meet the cartilage of the fifth rib.

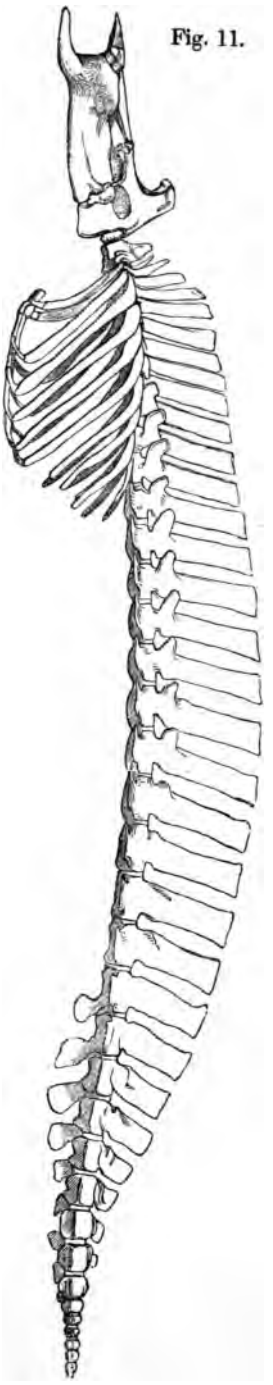
"The sternum is composed of four pieces, 20 inches long, with a width of between 5 and 7 inches. It is not yet sufficiently cleaned to enable me to have it photographed; this, however, will be done as soon as possible, and copies forwarded to the Society. The lumbars number twenty, the last nine having V-bones attached. The fifth lumbar is $17\frac{1}{2}$ inches high, 4 inches wide at the top, and $11\frac{3}{4}$ inches at the base, including the side processes. The eleventh lumbar is the widest, being $4\frac{3}{4}$ inches at the top. The caudals probably amounted to 13; but five of these are missing; the basal one is very small, about the size of a pea; and as it was firmly attached to the second last, there can be no mistake about it.

"The head is 2 feet 5½ inches long and 14 inches across at the widest part; the lower jaw 2 feet 3 inches long and 6¼ inches high behind the tooth. The left tooth measures 6 inches in length, 3⅜ inches in width, and is 1¾ inch thick [not well represented in the figure]. The space between the teeth measures 7¼ inches. The limbs are very imperfect; all the smaller bones are missing; and there is only a part of one scapula. I did not find the pelvic bones.

"This animal was captured about a year ago, near Lord Howe's Island." —*Krefft*, P. Z. S. 1870, p. 426.

THE END.

Fig. 11.



Dioplodon sechellensis.

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